Jan. 11, 1944. B. B. GEMENY 2,339,069

FIN TYPE BELT SUPPORTING PULLEY

Filed Feb. 5, 1943

Fig. 1

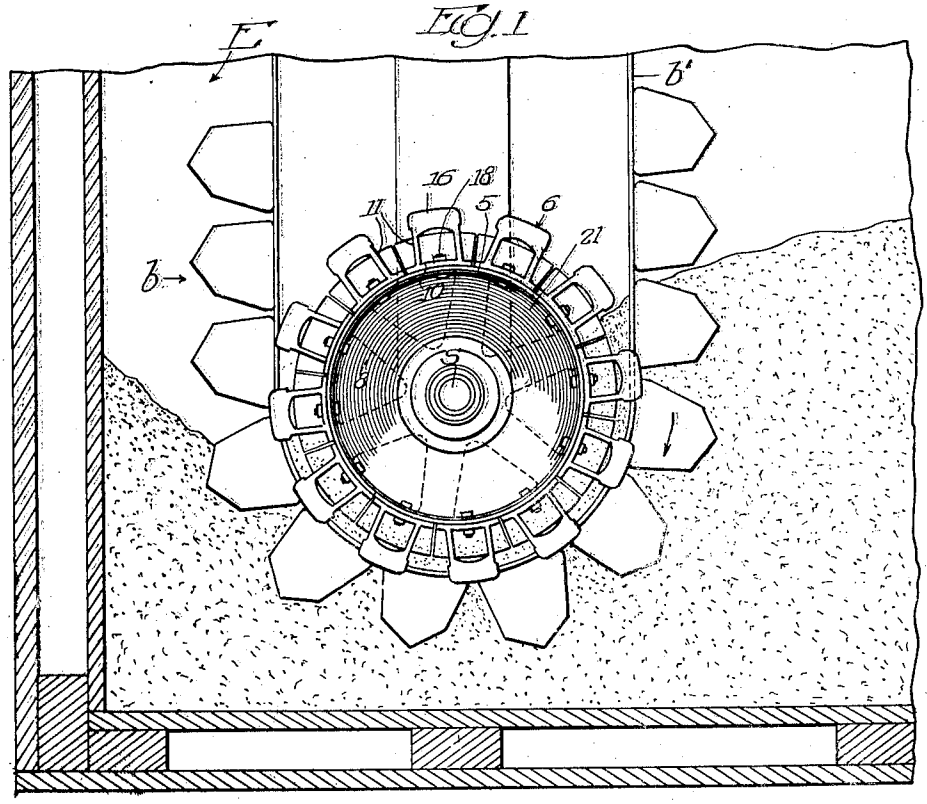


Fig. 2

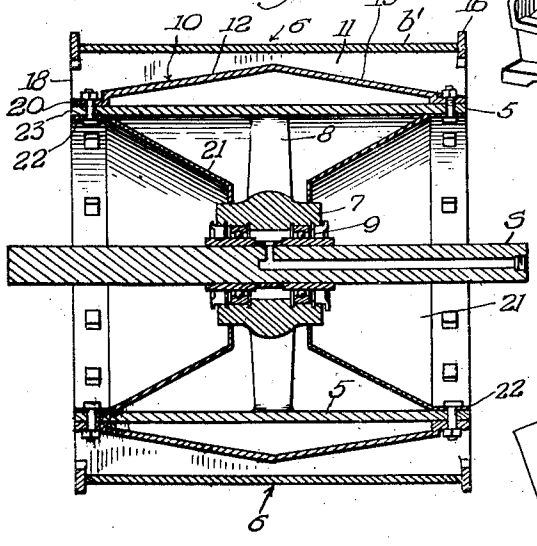


Fig. 3

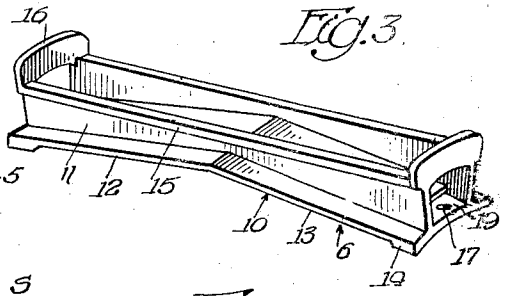
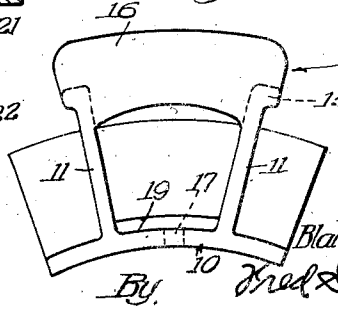


Fig. 4



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FIN TYPE BELT SUPPORTING PULLEY

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18 Claims. (Cl. 74—230.6)

The present invention relates generally to pulleys for supporting belts. More particularly the invention relates to that type of pulley which is designed and adapted to be used at the boot end of an elevator for granular or free flowing material, such, for example, as grain, serves as a rotatable support for the lower or boot end of the bucket carrying belt of the elevator, and embodies a plurality of radially extending, equidistantly spaced belt engaging fins, and in addition an annular wall structure which is disposed between, and inwards of, the fins and has side portions, the outer surfaces of which taper in the direction of the pulley sides and define with the fins oppositely facing wedge-shaped pockets whereby any material that collects between the pulley and the belt during drive or operation of the elevator is discharged to the sides of the pulley without being crushed or abrading or otherwise injuring the belt.

One object of the invention is to provide a pulley of this type which is an improvement upon, and has certain advantages over, previously designed pulleys of like character and is characterized by the fact that it is both rugged and durable and also highly efficient.

Another object of the invention is to provide a pulley of the type and character under consideration in which the fins and wall structure are in the form of segments which are arranged in an annular series around a cylindrical drum and are releasably secured to the drum so that they may be individually removed and replaced in the event of wear or breakage.

Another object of the invention is to provide a fin type pulley of the last mentioned character in which each of the segments has two fins and the ends of the fins of each segment are cross connected by side wings which serve to prevent over-running or lateral displacement of the belt relatively to the pulley during travel of the belt around the pulley.

A further object of the invention is to provide a fin type pulley embodying at the sides thereof inwardly extending frusto-conical plates for closing the ends of the segment supporting cylindrical drum.

A still further object of the invention is to provide a fin type pulley which is generally of new and improved construction, may be manufactured at a low and reasonable cost, and effectively and efficiently fulfills its intended purpose.

Other objects of the invention and the various advantages and characteristics of the present pulley will be apparent from a consideration of the following detailed description.

The invention consists in the several novel features which are hereinafter set forth and are more particularly defined by claims at the conclusion hereof.

In the drawing which accompanies and forms a part of this specification or disclosure and in which like letters and numerals of reference denote corresponding parts throughout the several views:

Figure 1 is a side view showing a fin type pulley embodying the invention in the boot of an elevator and serving rotatably to support the bucket equipped belt of the elevator;

Figure 2 is a section of the pulley taken through the axis thereof;

Figure 3 is a perspective of one of the segments around the cylindrical drum of the pulley; and

Figure 4 is an enlarged end view of the segment that is shown in Figure 3.

The fin type pulley which is shown in the drawing constitutes the preferred form or embodiment of the invention. It has many capabilities of use and serves as a belt supporting medium. For purposes of illustration the pulley is shown in the boot *b* of an elevator E. It is essentially of unitary character and constitutes a rotatable support for the lower or boot end of the bucket carrying belt b^1 of the elevator. As well understood in the art the buckets are adapted during drive of the belt when the elevator is in operation, to raise or elevate granular or free flowing material from the boot *b* and to discharge the material as they pass around a head pulley (not shown) at the upper end of the elevator. The pulley is rotatably mounted on a horizontal shaft *s* in the elevator boot *b* and comprises a cylindrical drum **5** and an annular series of segments **6** around the outer periphery of the drum. The drum is open ended, as shown in Figure 2, and is supported in concentric relation with, and for rotation about, the shaft *s* by way of a hub **7** and a plurality of spokes **8**. An anti-friction bearing **9** is interposed between the shaft *s* and the hub **7** and serves to permit the pulley to rotate freely around the shaft in connection with drive of the bucket equipped belt b^1 of the elevator E. The spokes **8** are connected to, and extend radially from, the central portion of the hub **7** and have the outer ends thereof secured fixedly or rigidly to the central portion of the drum **5**. The segments **6** correspond in length to the drum **5** and are preferably in the form of one-piece malleable iron castings.

The drum 5 constitutes a supporting structure for the segments 6. The latter are disposed in abutting relation. In addition, they are alike in construction and size and are also symmetrical with the result that they are interchangeable as well as reversible end for end.

Each of the segments 6 comprises an elongated bottom wall 10 and a pair of laterally spaced coextensive fins 11. The bottom wall consists of a left hand end portion 12 and a right hand end portion 13. The left hand end portion 12 has a flat upper face and slopes inwards. The right hand end portion 13 of the bottom wall 10 also has a flat top face and slopes inwards. The side edges of the left hand end portion 12 are outwardly convergent and bevelled or undercut in order that they abut flatly against the side edges of the left hand end portions of the bottom walls of the adjoining segments. The side edges of the right hand end portion are also outwardly convergent and bevelled or undercut in order that they fit snugly or flatly against the side edges of the right hand end portions of the bottom walls of the adjoining segments. Preferably, the bottom wall 10 is of uniform thickness except at its ends. At its ends the bottom wall 10 is provided with enlarged, depending pads 14 and these have the bottom faces shaped to fit flatly against the ends of the cylindrical drum 5, as shown in Figure 2. The fins 11 extend outwards from, and are formed integrally with, the bottom wall 10. They have straight belt engaging outer edges which are in parallel relation with the drum 5. Each of the fins 11 is disposed midway between the central portion of the bottom wall 10 and the adjacent side edge of the bottom wall with the result that half the surface area of the bottom wall is disposed between the two fins 11 and the other half of the surface area of the bottom wall is disposed outwards of the fins. The upper margins of the fins have integral enlarged beads 15 for reenforcing purposes. The ends of the fins are cross connected by way of a pair of outwardly extending side wings 16. These wings are joined to, and formed integrally with, the outer corners of the fins and have a twofold purpose in that they serve, first, to reenforce the fins and, second, to prevent overrunning or lateral displacement of the bucket equipped belt b^1 relatively to the pulley during travel of the belt around the pulley in connection with operation of the elevator E. As shown in the drawing, the side wings 16 are spaced outwardly of the ends of the bottom wall 10. The portions of the bottom wall 10 that underlie the side wings 16 have holes 17 for attaching bolts 18 and have cutouts at the top thereof in order to provide flat surfaces 19 around the outer ends of the holes 17.

As previously pointed out, the segments 6 are arranged in an annular series and abutting relation around the outer periphery of the drum 5. They are removably secured in place by way of the attaching bolts 18 and these extend through holes 20 in the ends of the drum. The spaces between the fins 11 of the segments form open ended oppositely facing wedge-shaped pockets whereby any material that collects between the belt and the pulley during drive or operation of the elevator is discharged to the sides of the pulley without being crushed or abrading or in any way injuring the bucket equipped belt b^1. When the elevator is in operation the granular or free flowing material in the boot b of the elevator E generally covers the pulley and a portion thereof lodges in the pockets. Because of the fact that the pockets are wedge-shaped due to the inward sloping of the left and right hand end portions of the bottom walls of the segments any material that collects between the belt and the pulley is forced to the pulley sides where it is discharged through the open ends of the pockets. Displacement of the material from the pockets takes place or occurs due to the fact that the pockets are wedge-shaped and the material therein is subjected to centrifugal force and also belt pressure. The side wings 16 which serve to cross connect and reenforce the fins 11 of the segments lap the side edges of the bucket equipped belt b^1, as shown in Figure 2, and hence prevent overrunning or lateral displacement of the belt during operation of the elevator.

In addition to the drum 5 and segments 6 the pulley comprises a pair of sheet metal closure plates 21 for the ends of the drum. These plates are frusto-conical and are located within the drum ends as shown in Figure 2. The large ends of the plates are disposed outwards of the small ends and have cylindrical flanges 22 which abut against the inner peripheral portions of the ends of the drum and are secured in place by the attaching bolts 18. Holes 23 are formed in the flanges 22 in order to accommodate the bolts. These bolts serve as single instrumentalities for removably securing the segments and closure plates in place and permit the segments and plates to be removed when desired. The inner or small ends of the plates extend around the hub 7. The plates serve to prevent the material in the elevator boot b from building-up or accumulating within the pulley.

The herein described fin type pulley is essentially simple in design and may be manufactured at a low and reasonable cost. It is efficient in operation and is characterized by the fact that the fins and wall forming structure are in the form of segments which are arranged in an annular series around the drum or supporting structure and are releasably secured in place so that they may be individually removed for replacement in the event of wear or breakage. The pulley is further characterized by the fact that the wedge-shaped pockets which are formed by the inwardly sloping bottom walls and the fins of the segments provide for effective discharge of the material that collects between the belt and the pulley during operation of the elevator and hence preclude such material from being crushed or damaging or wearing the belt.

Whereas the pulley has been described and illustrated in connection with an elevator of the grain variety it is to be understood that it may be used in handling granular or free flowing material other than grain. It is also to be understood that the invention is not to be restricted to the details set forth since these may be modified within the scope of the appended claims without departing from the spirit and scope of the invention.

Having thus described the invention what I claim as new and desire to secure by Letters Patent is:

1. A pulley adapted to support a belt and comprising an internal supporting structure with a rotatable mount therefor, and a plurality of elongated longitudinally extending abutting segments arranged in an annular series around, and removably secured to, the supporting structure and each embodying a bottom wall with the ends thereof sloping towards the supporting

structure and in addition a belt engaging fin connected to, and extending outwardly from, the bottom wall.

2. A pulley adapted to support a belt and comprising an internal supporting structure, a plurality of elongated longitudinally extending one-piece segments arranged in an annular series around, and secured to, the supporting structure and each embodying a bottom wall with the ends thereof sloping towards the supporting structure, and a substantially coextensive fin connected to, and projecting outwards from, the bottom wall and having a substantially straight belt engaging outer edge.

3. A pulley adapted to support a belt and comprising an internal supporting structure with a rotatable mount therefor, a plurality of elongated longitudinally extending unitary segments arranged in an annular series around the supporting structure and each embodying a bottom wall with the ends thereof sloping towards, and removably secured to, the supporting structure, and a belt engaging fin connected to, and extending outwardly from the bottom wall.

4. A pulley adapted to support a belt and comprising an internal supporting structure and a plurality of elongated longitudinally extending abutting segments arranged in an annular series around, and secured to, the supporting structure and each embodying a bottom wall with the ends thereof sloping towards the supporting structure, and a belt engaging fin connected to, and extending outwardly from the bottom wall and positioned between the side edges of said bottom wall.

5. A pulley adapted to support a belt and comprising a cylindrical drum with a rotatable mount therefor, and a plurality of elongated longitudinally extending abutting segments arranged in an annular series around, and removably secured to, the drum, and each embodying a bottom wall with the ends thereof sloping towards the drum ends, and a belt engaging fin connected to, extending lengthwise of, and projecting outwardly from, the bottom wall.

6. A pulley adapted to support a belt and comprising a cylindrical drum and a plurality of elongated longitudinally extending unitary abutting segments arranged in an annular series around the drum and each embodying a bottom wall with the ends thereof sloping towards, and removably secured to the ends of the drum, and a belt engaging fin extending longitudinally of, and projecting outwardly from, the bottom wall.

7. A pulley adapted to support a belt and comprising an internal supporting structure and a plurality of elongated longitudinally extending segments arranged in an annular series around, and secured to, the supporting structure and each embodying a bottom wall with the ends thereof sloping towards the supporting structure, and a pair of laterally spaced belt engaging fins extending longitudinally of, and projecting outwardly from, the bottom wall.

8. A pulley adapted to support a belt and comprising an internal supporting structure and a plurality of elongated longitudinally extending segments arranged in an annular series around, and secured to, the supporting structure and each embodying a bottom wall with the ends thereof sloping towards the supporting structure, and a pair of laterally spaced coextensive belt engaging fins extending lengthwise of, and projecting outwards from, the bottom wall and disposed inwards of the side edges of said bottom wall.

9. A pulley adapted to support a belt and comprising an internal supporting structure with a rotatable mount therefor, and a plurality of elongated longitudinally extending one-piece abutting segments arranged in an annular series around, and removably secured to, the supporting structure, and each embodying a bottom wall with the ends thereof sloping towards the supporting structure, and a pair of fins extending lengthwise of, and projecting outwards from, the bottom wall and having straight belt engaging outer edges.

10. A pulley adapted to support a belt and comprising an internal supporting structure and a plurality of elongated longitudinally extending segments arranged in an annular series around, and secured to, the supporting structure and each embodying a bottom wall with the ends thereof sloping towards the supporting structure, a belt engaging fin extending lengthwise of, and projecting outwards from, the bottom wall, and transversely extending side wings connected to, and extending outwards from, the outer corners of the fin and adapted to hold the belt against lateral displacement relatively to the pulley.

11. A pulley adapted to support a belt and comprising an internal supporting structure and a plurality of elongated longitudinally extending segments arranged in an annular series around, and secured to, the supporting structure and each embodying a bottom wall with the ends thereof sloping towards the supporting structure, a pair of laterally spaced belt engaging fins extending lengthwise of, and projecting outwards from, the bottom wall and a pair of side wings extending outwardly from the outer corners of the fins and serving to cross connect the fins and also to prevent lateral displacement of the belt relatively to the pulley.

12. A pulley adapted to support a belt and comprising a cylindrical drum with a rotatable mount therefor, and a plurality of elongated longitudinally extending one-piece abutting segments arranged in an annular series around the drum and each embodying a bottom wall with the ends thereof sloping towards, and secured to, the ends of the drum, a pair of laterally spaced belt engaging fins extending lengthwise of, and projecting outwards from, the bottom wall and disposed inwards of the side edges of said bottom wall, and a pair of transversely extending side wings connected to, and extending outwardly from, the outer corners of the fins and serving to cross connect the fins and also to prevent lateral displacement of the belt relatively to the pulley.

13. A pulley adapted to support a belt and comprising a cylindrical open ended drum, a plurality of elongated longitudinally extending segments engaging, and arranged in an annular series around, the drum and each embodying a bottom wall and a belt engaging fin connected to, and extending outwardly from the bottom wall, a pair of closure plates at the ends of the drum, and releasable attaching devices extending through the marginal portions of the closure plates and the ends of the drum and segment bottom walls.

14. A pulley adapted to support a belt and comprising an open ended cylindrical drum with a rotatable mount in its interior, a plurality of elongated longitudinally extending segments arranged in an annular series around the drum and each embodying a bottom wall with the ends

thereof sloping towards, and engaging the ends of, the drum, and a belt engaging fin extending lengthwise of, and projecting outwards form, the bottom wall, a pair of frusto-conical closure plates disposed within the ends of the drum and having the large ends thereof provided with cylindrical flanges in engagement with the end margins of the drum, and bolts extending through the flanges and the ends of the drum and segment bottom walls.

15. A segment adapted with like segments to be mounted in an annular series on a supporting structure and to form therewith a belt supporting pulley, and comprising an elongated bottom wall having the end portions of the top face thereof sloping or inclined in opposite directions, and a belt engaging fin extending lengthwise of, and projecting outwards from, said top face of the bottom wall.

16. A segment adapted with like segments to be mounted in an annular series on a supporting structure and to form therewith a belt supporting pulley, and comprising an elongated bottom wall having the end portions of the top face thereof sloping or inclined in opposite directions, and a pair of laterally spaced belt engaging fins extending lengthwise of, and connected to, the bottom wall and projecting outwards from said top face.

17. A one-piece cast metal segment adapted with like segments to be mounted in an annular series on an internal supporting structure and to form therewith a belt supporting pulley, and comprising an elongated bottom wall having the end portions of the top face thereof sloping or inclined in opposite directions, and a pair of coextensive laterally spaced belt engaging fins extending lengthwise of, and formed integrally with, the bottom wall, projecting outwards from said top face and spaced inwards from the side edges of the bottom wall.

18. A segment adapted with like segments to be mounted in an annular series on a supporting structure and to form therewith a belt supporting pulley, and comprising an elongated bottom wall having the end portions of the top face thereof sloping or inclined in opposite directions, a pair of laterally spaced belt engaging fins extending lengthwise of, and connected to, the bottom wall and projecting outwards from said top face, and a pair of belt retaining side wings connected to, and extending across, the outer end corners of the fins and spaced from the outer extremities of the end portions of the top face of the bottom wall.

BLAINE BENJAMIN GEMENY.