Feb. 28, 1956 J. D. CHRISTIAN 2,736,209

DRIVEN DRUM POWER TERMINAL

Filed July 31, 1952 3 Sheets-Sheet 1

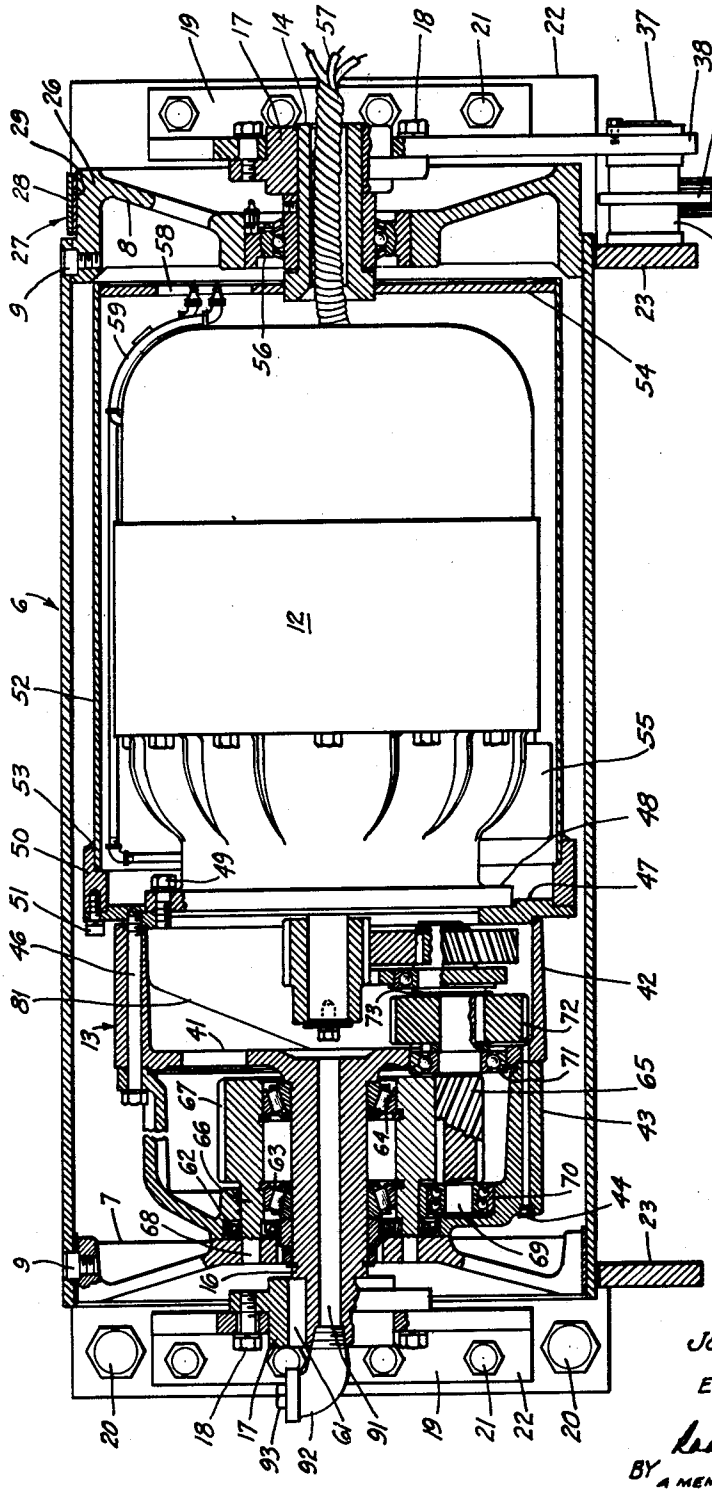


Fig. 1

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Fig. 2

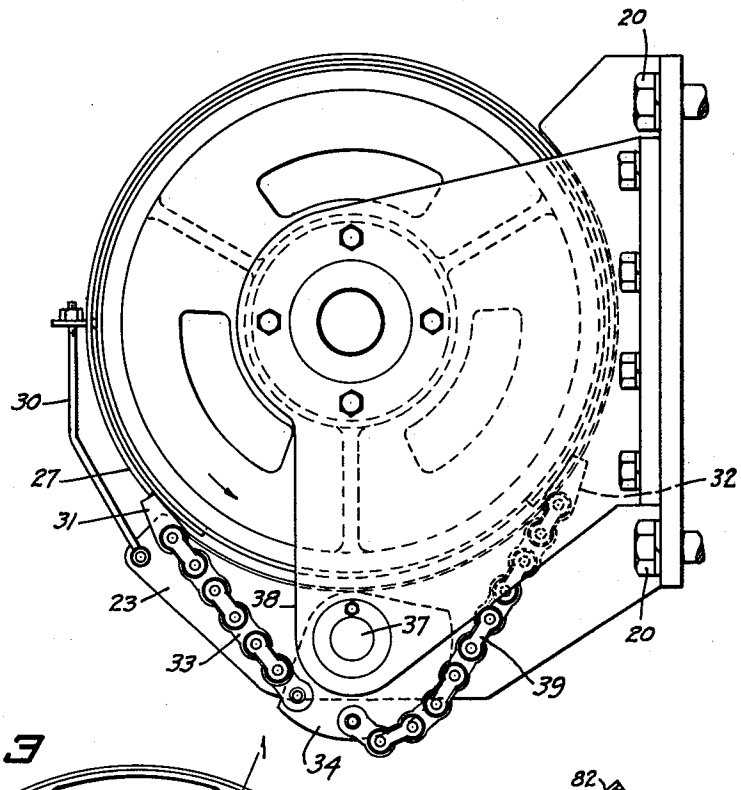
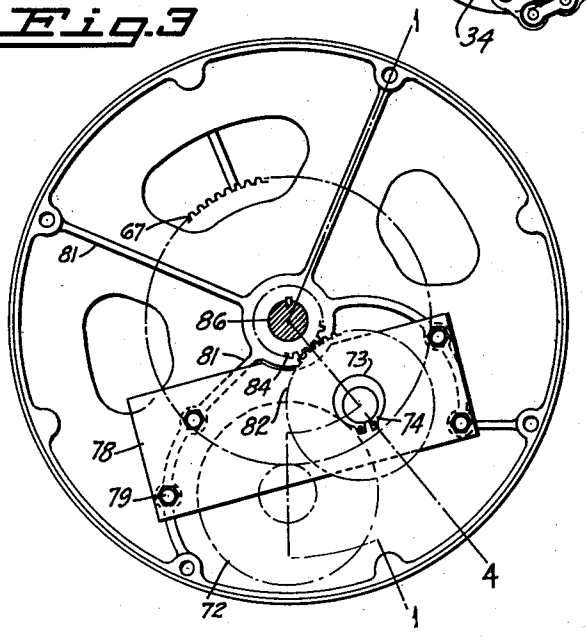


Fig. 3



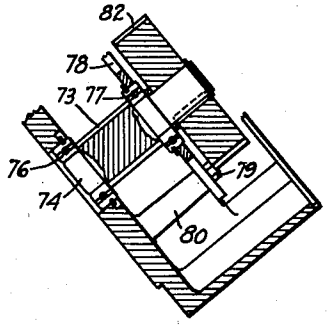


Fig. 4

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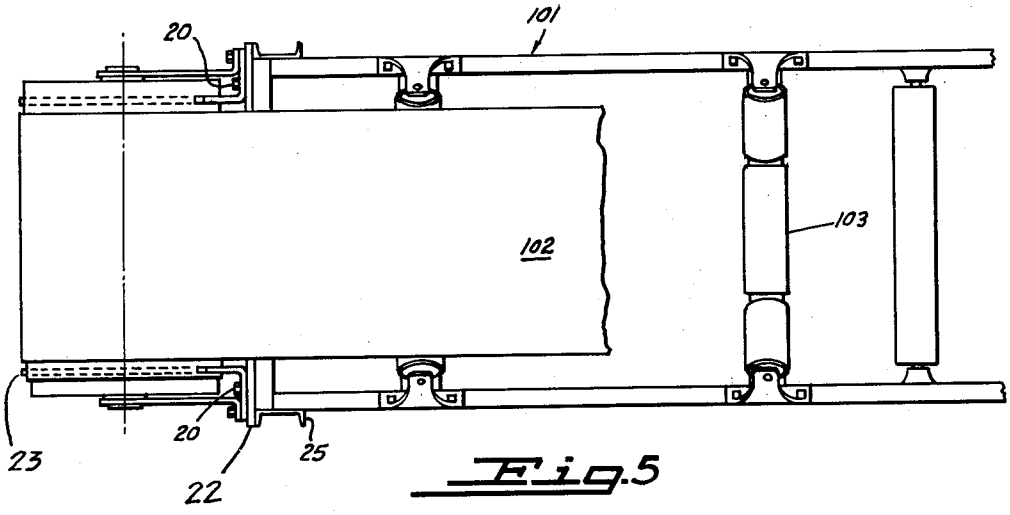


Fig. 5

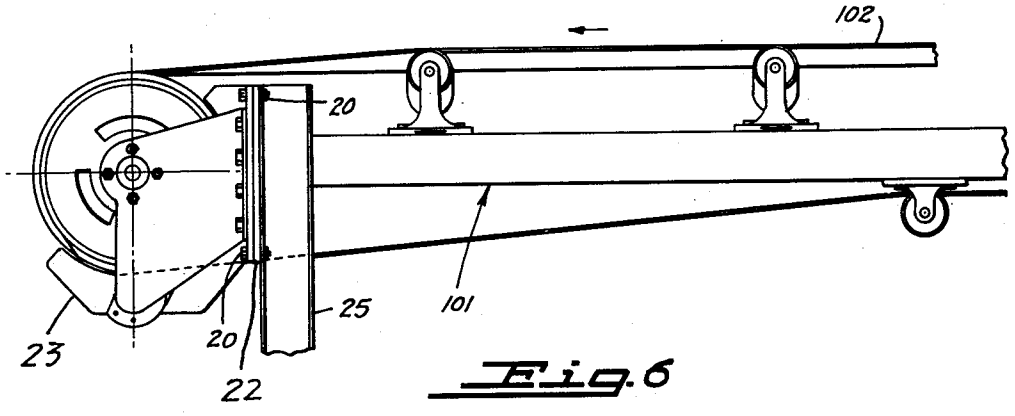


Fig. 6

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DRIVEN DRUM POWER TERMINAL

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2 Claims. (Cl. 74—421)

This invention relates to a driven drum power terminal in which the driving means, including a prime mover and a reduction gear device is enclosed within a drum which, in turn, provides a power take-off. A device within this general description is shown in my prior Patent 2,540,099, of February 6, 1951. Such a device is particularly suited to the driving of large belt or bucket conveyors, usually providing one terminal of the run of such a conveyor. When such a conveyor is brought to rest, the conveyor will, inherently, be unevenly loaded. If it is not prevented from moving, it may roll back until the load on the conveyor attains a point of approximating the low point of travel. If some portion of the reduction gear has broken, for example, continued movement of the conveyor may result in further additional damage to some component of the power terminal. In accordance with this invention, a novel, simple and readily effective backstop is provided which will permit rotation of the terminal drum only in that direction in which it is driven by the contained prime mover device.

The present invention also contemplates a driven drum power terminal construction in which the prime mover device can be removed from the drum without disturbing the drum and the latter's connection with the conveyor. This is a feature of considerable importance inasmuch as it enables maintenance and repairs to be effected on the power terminal, readily, with ease, and without disturbing the conveyor alignment or its connection with the belt or chain.

It is in general the broad object of the present invention to provide an improved driven drum power terminal construction.

Another object of the present invention is to provide a driven drum power terminal with a backstop permitting rotation of the drum in only one direction.

A further object of the present device is to provide a driven drum power terminal which constitutes a packaged power unit and which can be inspected, repaired or altered without removing the drum from its connection with an associated conveyor device such as a belt or chain.

The invention includes other objects and features of advantage, some of which, together with the foregoing, will appear hereinafter wherein the present preferred form of driven drum power terminal of this invention is disclosed.

In the drawings, Figure 1 is a side view, partly in section, the view through the speed change device portion of the device being taken along the section line 1—1 of Figure 3.

Figure 2 is an end elevation of the device shown in Figure 1.

Figure 3 is an end view of the device showing the sectional line along which the speed change device shown in Figure 1 is depicted.

Figure 4 is a section taken along the line 4—4 in Figure 3.

Figure 5 is a plan view, illustrating the device in driving relation to a conveyor structure, while Figure 6 is a side elevation thereof.

The subject of this invention may be, and herein will be, described specifically as applied to a driven drum, specifically a smooth face drum intended to operate as a driving terminal of a wide belt conveyor. However, the outer periphery of the drum may take any one of several configurations.

In the form of the device shown in the drawing, a driven drum 6 is provided. End walls are provided on the drum by multi-armed spiders 7 and 8 secured at each end of the drum by cap screws 9. Mounted within the drum to drive it is a prime mover device comprising a prime mover 12, typically shown by an electric motor, and a gear reduction unit 13, providing a motor and the gear unit secured together and are fixed in position and remain stationary within the drum, being supported by spindles 14 and 16 provided respectively at the motor end of the drum and at the gear drive end of the drum. Each extension is mounted in a stationary mounting flange 17, each of these being mounted by cap-screws 18 upon a bracket generally indicated at 19. Spindle 16 is secured by a key 61 to its journal support 17.

Each bracket 19 is secured by cap-screws 21 to a suitable fixed support 22 (Figures 2, 5 and 6). Also mounted upon the fixed support 22 but within the length of the drum 6 are spaced semi-circular brackets 23, fixed in position by studs 20 and having a support surface thereon closely fitting the drum to provide support therefor when either or both of brackets 19 are removed from attachment with the associated fixed support 22 to permit removal of the motor and gear reduction unit from the interior of the drum, as will be presently explained further in detail.

End wall 8 includes an annular brake drum portion 26 extending beyond the drum 6 and providing a support for a brake band structure, generally indicated at 27, and made up of an outer metal band 28 and a composition friction brake band 29. A rod 30 is secured at one end to adjacent bracket 23 and, at its other end, adjustably to the brake band to retain the band in a desired position of adjustment with respect to the brake drum. Lugs 31 and 32 are secured at opposite ends of the brake band 27, which extends almost completely around the brake drum 26, as appears in Figure 2. Lug 31 is attached to a length of chain 33, this in turn being attached to one end of a cam member 34 fixed upon a sleeve 36. An arm 38 is extended from the bracket 19 and a cam pin 37 is extended between arm 38 and the cooperatively adjacent bracket 23 to provide a support for the sleeve 36. Lug 32 is secured to a length of chain 39, this being attached to the other side of cam member 34 and extending about a portion of its periphery, as appears in Figure 2.

So long as the drum rotates in a counter-clockwise direction (Figure 2), the brake band rides free upon the drum and remains in a position wherein it does not exert any frictional force upon the drum. However, when the drum rotates in a clockwise direction, the friction is sufficient to cause a pull on chain 33 and movement of cam member 34. This movement of the cam causes chain 39 to wrap about the outer periphery of cam member 34 and draw the brake band into such frictional engagement that the drum is stopped and held against further clockwise rotation.

The prime mover 12 and the gear reduction unit 13 are supported between spindle 14 and 16 as follows: Spindle 16 is provided as an integral extension of a wall 41 providing an end closure of gear case 42. A gear case cover 43 is secured by cap-screws (not shown) to the wall 41. The gear case 42 is, in turn, secured by four screws 46 to an annular motor mounting adapter 47; motor end bell flange 48 is secured by studs 49 on one side of the motor mounting adapter 47; also secured to the motor mounting adapter 47 is an annular ring 50 secured by screws 51

about the outer periphery of motor mounting adapter 47. One end of a cylindrical shell 52 is secured as by welding 53 to an end of the annular ring 50, while the other end of the shell 52 is closed by welding to a plate 54, to which spindle 14 is also secured. End wall 8 is supported by bearing 56 on spindle 14, the latter being hollow to pass leads 57 to the motor. Plate 54 is provided with apertures 58 to admit air and pass lubricating conduits 59 to lubricate various bearings in the motor. Apertures 55 are also provided in shell 52 to permit air circulation over the motor. Spindle 16 is provided with a passage 91 closed by a street-L 92 and a plug 93, while the lower part of the gear unit includes a passage closed by plug 44. This permits lubricant to be supplied to the gear unit and to be changed when desired.

The gear reduction unit shown includes the following:

Thrust roller bearings 63 and 64 are provided between spindle 16 and gear 67 to provide for the rotational support of gear 67 concentrically with the spindle 16, while oil-seal 62 is provided between gear case cover 43 and annular extension 66 on gear 67. A plurality of driving lugs 68 on gear 67 extend beyond seal 62 and into the end wall 7 to drive the spider and its associated drum 6.

Gear 67 is driven by gear 65 formed upon shaft 69, the latter being mounted in bearings 70 and 71 provided, respectively, in gear case cover 43 and wall 41. Shaft 69 extends beyond the wall 41 and carries another gear 72 thereon in driving engagement with a gear 73 formed upon a shaft 74; shaft 74 is mounted in bearing 76 in wall 41 and in a bearing 77 mounted in a plate 78. Plate 78 is secured by screws 79 to several of the column-like supports 80 formed in bracing-fins 81.

Shaft 74 includes a gear 82 upon its other end enmeshed with gear 84, secured to the drive shaft 86, which extends from the prime mover 12.

The drive described provides a three-step reduction, but more or less can be employed if desired, as can any other gearing arrangement. That shown and described possesses certain unique advantages but the back-stop, the support of the drum 6 independently of the prime mover device are features useful with any like terminal.

In use, the unit is mounted on an end support 25 of a conveyor frame such as that generally indicated at 101, the support 22 being secured by screws 20 to the fixed end support 25, as is shown in Figures 5 and 6. A flexible flat belt 102 is trained about several supporting conveyor rollers 103, the latter being of a construction known in the art. The power terminal serves to move the conveyor belt from right to left, as appears in Figures 5 and 6 and, so long as this continues, the brake or back-stop permits the drum to rotate freely. However, once the power is cut off, any tendency of the belt to move in the opposite direction, that is, from left to right in Figures 5 and 6, results in the brake being applied and undesired rotation of the drum prevented.

If it is desired to remove the power unit from inside the drum for any reason, this is effected by removing bracket 19 at the gear reduction end of the drum (the left-hand end of Figure 1) and by removing the cap screws 9 and releasing the electrical connections on the motor so that leads 57 can pass through extension 14. The drum is supported between the brackets 23 and the entire prime mover device can be slid out of position and replaced readily by another; the back-stop or brake holds the drum against rotation. If it is desired only to have access to the motor, it is only necessary to remove the bracket at the motor end of the drum, which is then supported independently of the prime mover device.

I claim:

1. In a driven drum power terminal having a prime mover device, means supporting each end of the prime mover device, a cylindrical drum surrounding the prime mover device, said drum having a belt extended thereabout for driving by the drum, the belt extending from the drum in such relation to the drum that a load on the belt tends to rotate the drum in a first direction, means supporting the drum for rotation on the prime mover device in a selected position of alignment, a driving connection between the prime mover device and the drum enabling the prime mover to rotate the drum in a second direction, brake means permitting rotation of the drum in only said second direction, and means supporting the drum in substantially said selected position of alignment and independently of said means supporting said drum for rotation on the prime mover device.

2. In a driven drum power terminal, a prime mover device, means supporting each end of the prime mover device, a cylindrical drum surrounding the prime mover device, said drum having a belt extended thereabout for driving by the drum, the belt extending from the drum in such relation to the drum that a load on the belt tends to rotate the drum in a first direction, means supporting the drum for rotation on the prime mover device in a selected position of alignment, a driving connection between the prime mover device and the drum enabling the prime mover to rotate the drum in a second direction, brake means permitting rotation of the drum in only said second direction, a pair of brackets adjacent each end of the drum and each having a support surface closely fitting a side of the drum to support the drum in substantially said selected position of alignment and independently of said means supporting said drum for rotation on the prime mover device.

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