

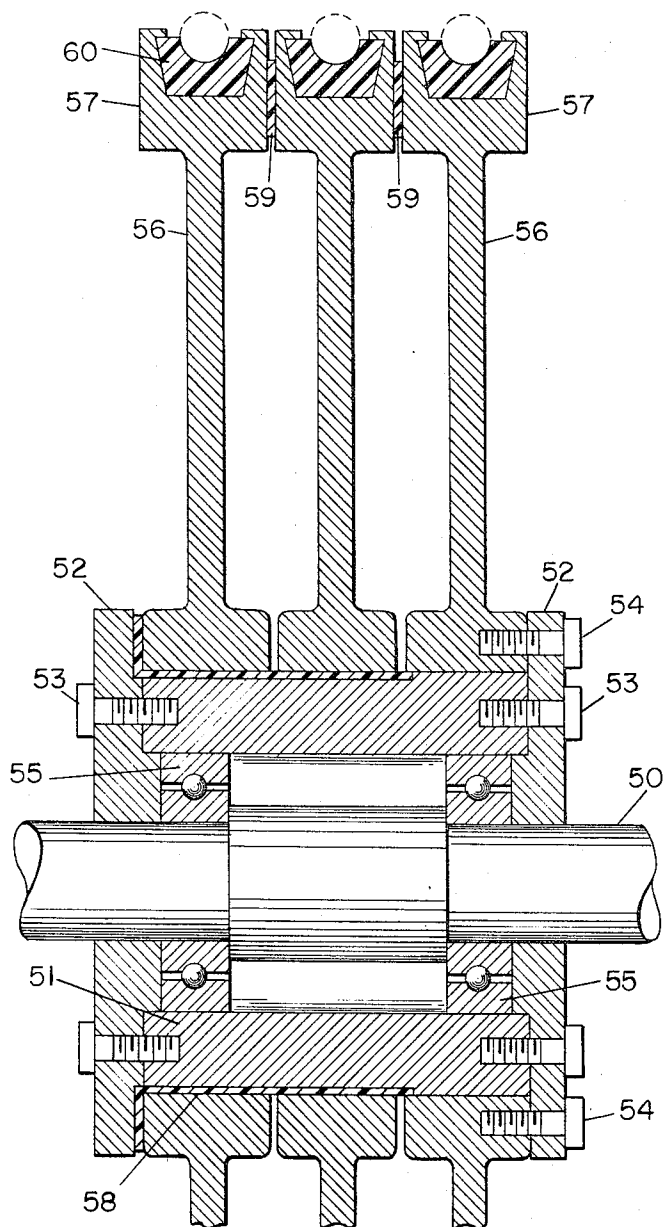
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SEGMENTAL ELEVATOR SHEAVE ARRANGEMENT

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SEGMENTAL ELEVATOR SHEAVE ARRANGEMENT

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5 Claims. (Cl. 254-192)

ABSTRACT OF THE DISCLOSURE

A traction machine elevator sheave arrangement which is constructed of a plurality of individual sheaves, one for each of the ropes of an installation. Individual ones of the sheaves are so mounted as to be free to rotate about a common hub independently of each other and of the hub.

This concerns an invention which relates to elevators and more especially to sheaves for electric traction machine elevators. It is a continuation-in-part of co-pending application for "Noise Abating and Traction Improving Sheave," Ser. No. 350,999, filed Mar. 11, 1964, now Patent No. 3,279,762, issued Oct. 18, 1966.

In "slipping" and "creeping" along the surfaces of the sheaves around which they travel, the hoisting ropes of traction machines not only prematurely shorten their own lives but also introduce noise into elevator installations. While most of the aspects of these problems arise as the ropes pass around the driving sheave in an installation, some significant factors are contributed by other sheaves as well. In taking a comprehensive view of these problems, therefore, the parent application, although it is primarily concerned with the noise and rope wear arising only at driving sheaves, nevertheless, specifically discusses that part of the problems of rope wear and noise contributed by multi-groove idler sheaves with unequal groove diameters. In this latter regard, it particularly refers to multi-groove idler sheaves of 2 to 1 roping systems. However, what it says about these applies to multi-groove deflector and idler sheaves of single and double wrap elevators in other roping systems, also.

During each revolution of a multi-groove deflector or idler sheave, each of its several grooves has to carry the same length of rope. Of course, the larger the diameter of a groove the more rope it is able to carry during each revolution. Consequently, if all grooves do not have the same diameter, the ropes in the smaller grooves have to slip some amount during each revolution in order for their grooves to carry the same length of rope as the largest groove. Both noise and rope wear accompanies the slip of these ropes.

Attempts have been made to eliminate differences in deflector and idler sheave groove diameters by machining each of the several grooves to have the same diameter. As a practical matter of manufacture, however, this is difficult to do. As a result, it is not uncommon to find as much as .040 of an inch difference between the groove diameters on such sheaves. Such a tolerance leads to the rope in the smallest groove slipping more than 8 inches in 600 feet of rope travel over a standard 36 inch diameter sheave.

One of the objects of this invention is to alleviate that hoisting rope wear and noise in traction machine elevators which is caused by unequal idler and deflector sheave groove diameters.

Another object is to reduce the amount of rope slip which occurs on multi-groove idler and deflector sheaves of traction machine elevators.

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In a preferred embodiment of the invention a multi-groove sheave is constructed of a plurality of segments or individual sheaves. Each segment has a groove in which one hoisting rope is guided and each rotates independently of the rest of the segments so that the entire sheave may be said to be free running.

Other objects and features of the invention will be evident from the following description and appended claims when read in conjunction with the drawing, in which

10 The sole figure is a sectional view with parts broken away of a sheave constructed in accordance with the invention.

As is shown in the drawing, sheave shaft 50 supports bearings 55, which may suitably be of the ball type, and which in turn support the sheave hub 51. This hub supports a plurality of segments or individual sheaves, each having a flange section 56 and a rim section 57 in which a channel or groove 60 is machined. These individual sheaves are each mounted on the hub 51 and secured there by clamping rings 52, which are bolted to hub 51 by a pair of bolts 53. The rightmost segment or sheave is also bolted to the adjacent clamping ring by one or more bolts 54, such that it turns in unison with the rings and hub. The remaining sheaves are each mounted with a plastic sleeve bearing 58 intermediate the hub 51 and the flange section such that each one is free to rotate on the hub. A similar plastic bearing surface 59 is interposed between adjacent rim sections. In this manner each sheave section can adjust its speed of rotation to equal the linear speed of its conjugate rope; the speed of which is a function of the speed of revolution of its drive sheave and the diameter of its driving groove. Because the differences in groove diameters are small, the various individual sheaves will make substantially the same number of revolutions in a full length trip; the differences between them being usually in fractional revolutions. This permits the use of plastic bearings 58, 59 which may be composed from polytetrafluoroethylene which is a fluorocarbon resin commercially available under the trademark Teflon. This may be used alone or in combination with an adulterant to improve its wearing properties. One such product is commercially available under the trademark Rulon.

An elastomer insert is shown snugly lining each channel 60. These may suitably take the form of the treaded elastomer inserts more fully described in parent application Ser. No. 350,999. Such an arrangement is especially suitable for deflector sheaves of the secondary variety and when so used is particularly effective in eliminating rope patten on these sheaves.

Variations in the disclosed arrangement are readily envisioned. For example, channels 60 and the elastomer inserts therein may be eliminated and instead customary round seated or undercut rope grooves could be machined directly in rim sections 57.

Various other modifications are also possible to make the invention more suitable for different conditions without departing from its scope. It is intended, therefore, that all matter contained herein be interpreted as illustrative and not in a limiting sense.

What is claimed is:

1. In a traction machine elevator sheave arrangement around which a plurality of hoisting ropes pass; a plurality of segments, or individual sheaves, each provided for a different hoisting rope; a shaft; a pair of bearings supported on said shaft; a hub rotatably supported on said bearings and common to said plurality of segments; said segments being mounted adjacent each other on said hub; a sleeve bearing intermediate said hub and at least all but a particular one of said segments whereby all of said segments are free to rotate independently of each other; each of said segments having a rim section extend-

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ing at substantially the same predetermined radial distance from said hub; a rope groove in each rim section receiving and delivering the rope for which its segment is provided; and means attached to said hub securing said segments in their respective locations thereon.

2. In a traction machine elevator sheave arrangement around which a plurality of hoisting ropes pass, according to claim 1, including means fastening said particular one of said segments to said hub so that it rotates therewith, the remainder of said segments being free to rotate independently of the rotation of said hub.

3. In a sheave arrangement according to claim 2 in which a plastic bearing surface is interposed between adjacent segments and a plastic sleeve bearing is intermediate said hub and the remainder of said segments.

4. In a sheave arrangement according to claim 3 in which said plastic sleeve bearing and said plastic bearing

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and said plastic bearing surfaces are composed of polytetrafluoroethylene.

5. In a sheave arrangement according to claim 1 in which a channel is formed in each of said rim sections and an elastomer insert snugly lines the channel in each rim section, each said insert having one of said rope grooves formed therein.

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