Feb. 21, 1956 R. OBER 2,735,554

HOIST WITH TILTED DRUM

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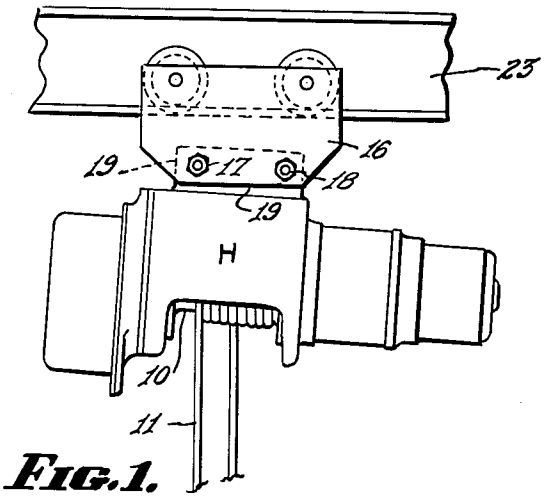


FIG. 1.

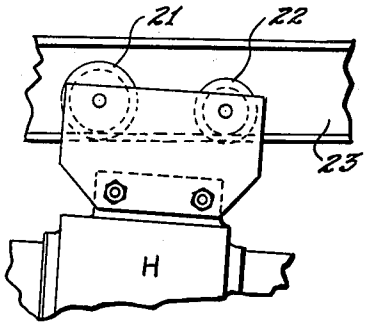


FIG. 2.

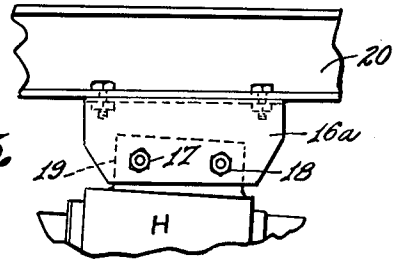
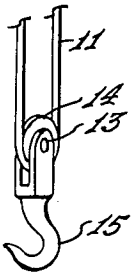


FIG. 3.



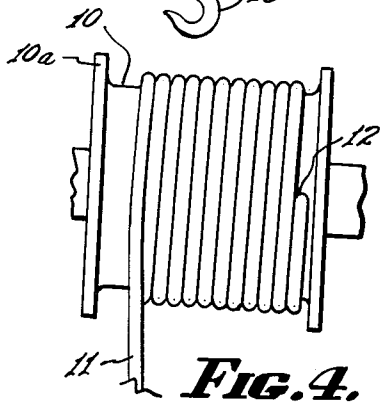


FIG. 4.

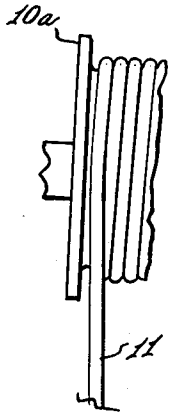


FIG. 5.

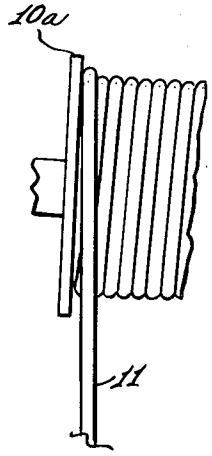


FIG. 6.

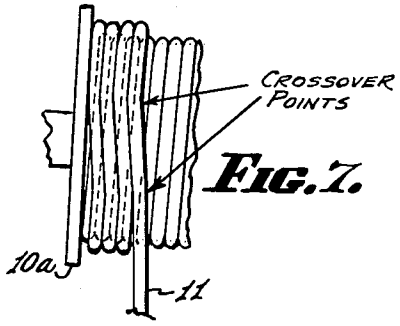


FIG. 7.

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HOIST WITH TILTED DRUM

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4 Claims. (Cl. 212—134)

This invention relates to a hoist having a tilted drum. While the invention is applicable to hoists of all kinds, it will be described herein as applied to a typical small industrial electric hoist which may be mounted on a trolley or not.

A hoist of the type under consideration generally has a drum upon which a hoist cable is adapted to be wound. the drum is adapted to be driven through reduction gearing by power means, such as a pneumatic motor or an electric motor or it may be manually actuated by means of a chain.

With hoists of this type, if it is necessary to raise the load a considerable distance or if a block is used in association with the hoisting cable, more cable must be wound upon the drum in a hoisting operation than can be accommodated in a single layer on the drum. Thus, for example, a typical small hoist may have a drum which will accommodate an 18 foot lift with one layer of cable on the drum. If it is desired to have greater than an 18 foot lift, it is necessary for the cable to start and wind a second layer on top of the first layer.

One of the difficulties encountered in this situation is that when the cable reaches the flange at the end of the drum and starts to wind a second layer, it will usually pile up adjacent the flange for two or three wraps before it starts back toward the other end of the drum. The result is that when the cable starts back it allows the load to drop a short distance suddenly and the amount of drop will depend of course upon how many convolutions of cable have wrapped up. This sudden drop constitutes a severe shock on the cable and on the hoist and is very undesirable.

Another problem which arises is involved in laying on the second layer of convolutions. In order to advance back across the first layer, the cable will fall in the grooves or depressions between convolutions of the first layer and actually wind back a turn in each revolution of the drum, so that it must then be forced across two depressions by pressure on the adjacent convolutions of cable so as to provide for a net advance of one turn per revolution. This condition gives rise to severe wear at the crossover points.

With the foregoing considerations in mind, it is the principal object of the present invention to provide means for preventing the piling up of cable at the end of the first layer of convolutions and thereby to eliminate the sudden shocks encountered when the cable finally starts back in the second layer.

It is another object of the invention to reduce the wear incident to cable crossing over the convolutions of the first layer in winding up the second layer.

These and other objects of the invention which I shall point out in greater detail hereinafter or which will be apparent to one skilled in the art upon reading these specifications, I accomplish by that certain construction and arrangement of parts of which I shall now describe some exemplary embodiments.

Reference is made to the drawings forming a part hereof and in which:

Figure 1 is an elevational view of a typical industrial electric hoist mounted on a trolley and showing the invention.

Figure 2 is a fragmentary view similar to Figure 1 showing a modification.

Figure 3 is a fragmentary view similar to Figure 2 showing another modification.

Figures 4 to 7 inclusive are enlarged fragmentary detailed views showing the composition of the first layer of cable and the start of formation of a second layer.

Briefly, in the practice of my invention, I overcome the difficulties outlined above by providing means for mounting the hoist with its drum axis displaced from the horizontal such that the end of the drum toward which the cable convolutions are added in the first layer is the higher end.

Referring now more in detail to the drawings, there is shown in Figure 1 a hoist, the details of construction of which form no part of the invention and will not be described. The hoist may be electrically driven, pneumatically driven or manually operated by means of a conventional chain. The hoist comprises a flanged drum **10** about which a cable **11** is adapted to be wound when the drum is rotated. In the particular embodiment shown, one end of the cable is secured to the drum as at **12** (Fig. 4) and is then adapted to be wound around the drum, passed through a block **13** about a pulley **14**, and its other end is secured to the frame of the hoist, more or less centrally with relation to the length of the drum. The point of fastening of the other end of the cable is behind the drum **10** in Figure 1 and cannot be seen. The block **13** generally includes a hook **15** to which the load to be lifted is secured. The hoist generally is designated by the letter H.

As the hoist of Figure 1 is actuated to raise a load, convolutions of the cable **11** are wrapped around the drum **10** with the new convolutions being added toward the left, as seen in Figure 1. In accordance with my invention, I mount the hoist in such manner that the axis of the drum is tilted with respect to the horizontal with the left-hand end (the end toward which the cable convolutions are added in the first layer) being the higher.

In Figure 1, the hoist is shown as being suspended from a trolley **16** by means of bolts **17** and **18**. In this embodiment, the hole for the bolt **17** is slightly lower in the member **19** than the hole for the bolt **18**. The showing of Figure 3 is substantially the same as that of Figure 1, except that the hoist is secured to a hanger element **16***a* which is secured to a beam **20**.

As shown in Figure 2, the tilt may be achieved, in the case of a trolley mounted hoist, by providing the trolley with a wheel **21** which is slightly larger than the wheel **22**. When these wheels ride upon the rail **23**, the axis of the hoist will be tilted as shown.

By examination of Figures 4 to 7, the result of tilting the axis of a hoist can be observed. In Figure 4 the convolutions are approaching the left-hand flange **10***a* of the drum. In Figure 5 it will be seen that the flange **10***a* will not permit an additional convolution on the drum itself.

After approximately a further half revolution of the drum from the position of Figure 5, we have the situation as it is shown in Figure 6 and it can be observed that the cable **11** is now hanging in a position to cross over the last wrap in the first layer. Due to the tilt of the drum, there is a slight thrust parallel to the drum shaft which prevents the cable from piling up at the drum flange, and the second layer will be neatly wound, as seen in Figure 7. This same thrust parallel to the drum shaft also reduces the pressure that must be exerted by the adjacent wrap of

cable to cause it to jump across two wraps of cable on the first layer, as it progresses along the drum. In this manner wear on the cable is greatly reduced and the danger of shocks as a result of dropping the load is avoided.

In these drawings the degree of tilt has been exaggerated in order to illustrate more clearly the principles of the invention. In actual practice, I have found that the advantages of the invention may be achieved with a tilt as little as about one and one-half degrees to the horizontal. It requires only a very small thrust from this tilting to prevent piling and wear is greatly reduced in this way.

It will be clear that the invention may be modified in numerous ways without departing from the spirit of the invention. The specific methods of mounting the hoist are exemplary only and are not to be considered as limitations on the invention.

Having now fully described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A hoist having a flanged drum upon which a hoisting cable is adapted to be wound, means for rotating said drum, and means for suspending said hoist from an overhead support with the axis of said drum displaced from the horizontal such that that end of the drum toward which the cable convolutions are added in the first layer on said drum is the higher.

2. A hoist according to claim 1, wherein the axis of said drum is displaced from the horizontal by a small angle on the order of about 1½ degrees.

3. A hoist according to claim 1, wherein said suspending means include a trolley and said hoist is secured to said trolley in a tilted position.

4. A hoist according to claim 1, wherein said suspending means include a trolley and said trolley has wheels of unequal size to cause the axis of said drum to be tilted with respect to the horizontal.

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