United States Patent [19]

Hrescak

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[54] FAIRLEAD CARRIAGE

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[52] **U.S. Cl.** .....**242/158.4 R,** 242/157.1

[51] **Int. Cl.** **B65h 54/28**

[58] **Field of Search** .242/158 R, 158.2, 158.4, 158.2, 242/158.5, 158 F, 158 A, 157, 157.1

[56] **References Cited**

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1,994,373	3/1935	Thorne	242/158.2 X
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3,458,153	7/1969	Lawrence	242/158 R
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FOREIGN PATENTS OR APPLICATIONS

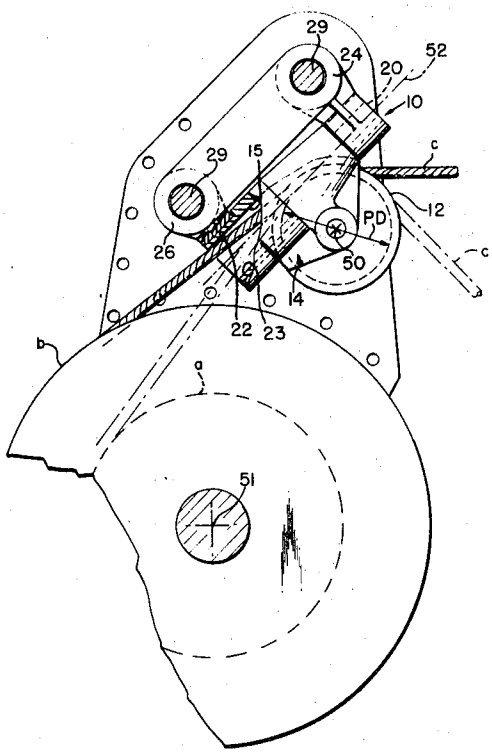
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[57] **ABSTRACT**

A level-wind fairlead carriage is reciprocably mounted for traversing along the length of a winch drum. The carriage is provided with a fairlead sheave rotatably mounted on a bracket for movement about an axis parallel to the axis of the winch drum. The bracket is mounted for pivotal movement about a second axis which lies on a line generally tangent to the winch drum. The pitch diameter of the fairlead sheave also ends on the second axis.

5 Claims, 2 Drawing Figures



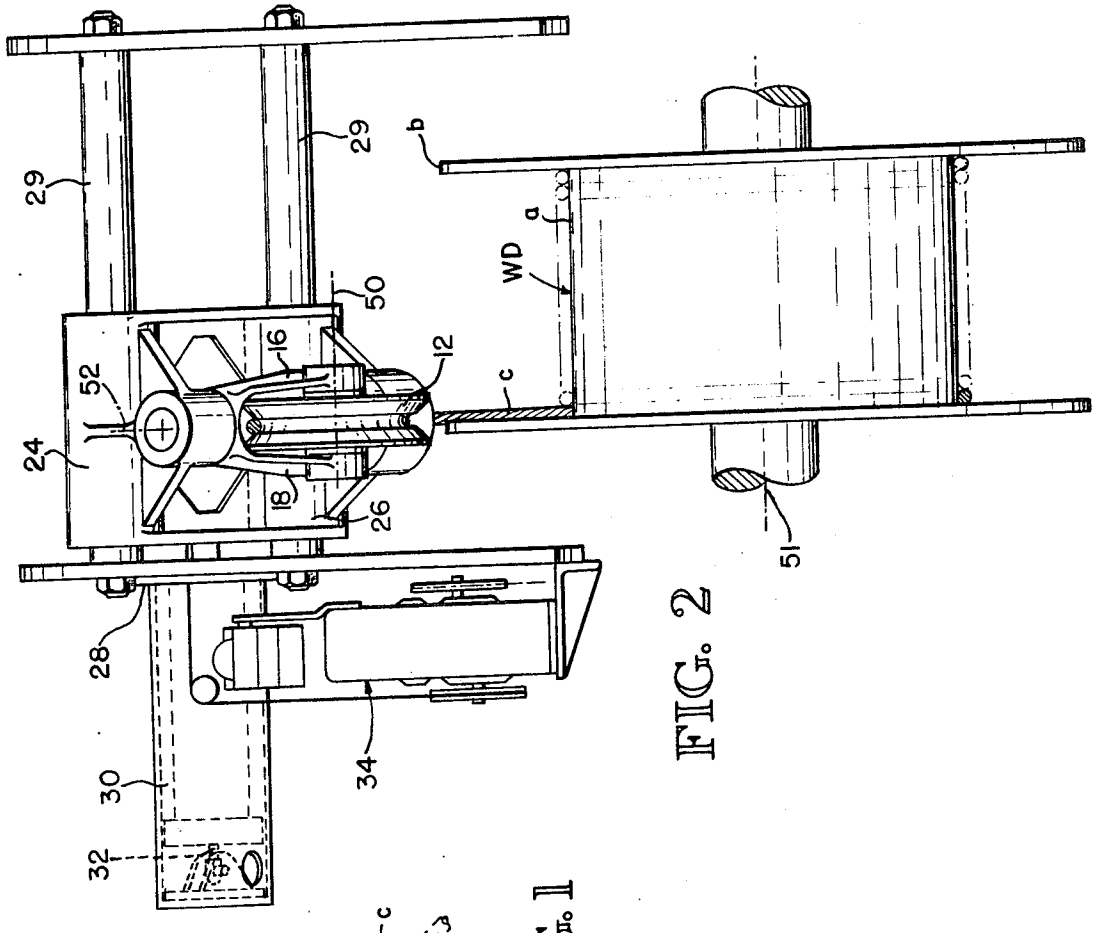


FIG. 2

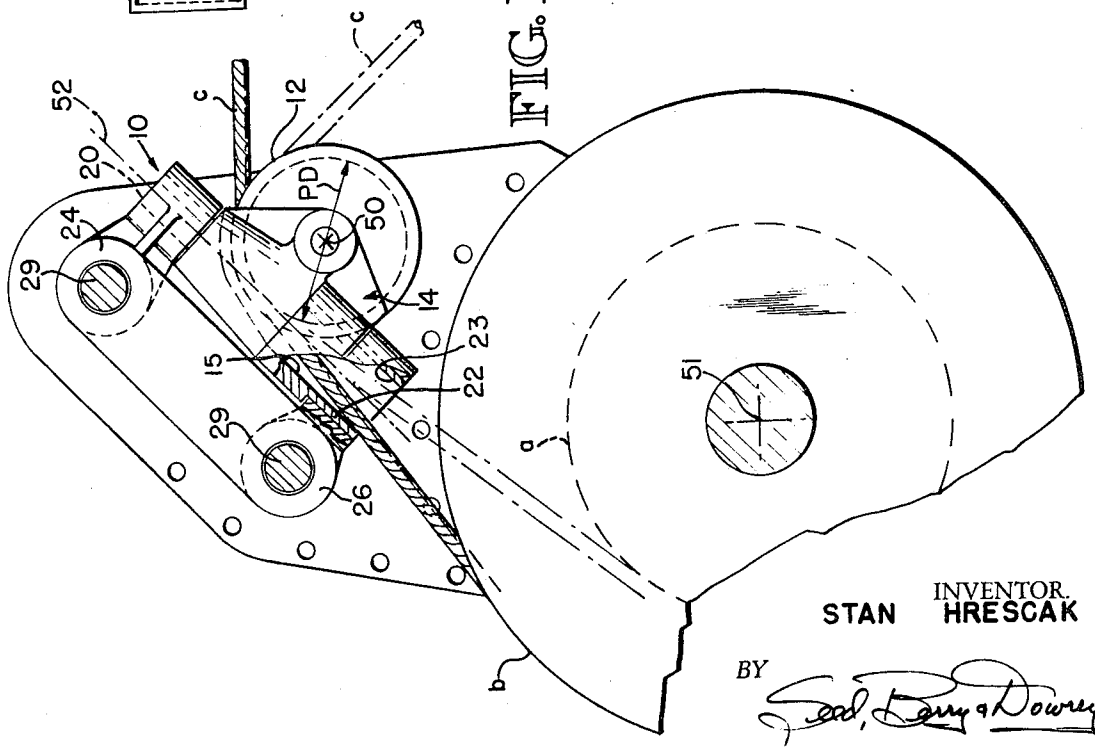


FIG. 1

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FAIRLEAD CARRIAGE

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention pertains to fairlead carriages of the type used in level-wind winch devices.

2. Description of the Prior Art

A difficulty presented by prior art pivoted fairlead sheaves is that the direction of the incoming cable affects the alignment of the sheave. If the cable pivots the sheave at a sharp angle for example the cable leaving the sheave will be spaced from the previous wrap on the winch drum by a relatively large distance. The next wrap will thus overlap the previous one or will be spaced from it and in either case will result in an improper lay on the drum.

In U.S. Pat. No. 3,458,153 a second sheave is provided to intercept the cable and guide it to the fairlead sheave from a single direction. Although this is a solution to the above problem a second sheave and its related hardware is too expensive to be commercially feasible.

SUMMARY OF THE INVENTION

It is an object of this invention to provide a fairlead carriage having a fairlead sheave that maintains the cable in proper lead alignment with the previous wrap of cable on the winch drum but which can pivot to compensate for changes in the direction of the cable moving it to or from the fairlead sheave.

It is another object of this invention to provide a fairlead carriage which is compact and inexpensive to manufacture.

Basically the fairlead carriage of this invention provides a fairlead sheave, first mounting means for mounting the fairlead sheave for rotation about a first axis, second mounting means for mounting the first mounting means for pivotal movement about a second axis, the fairlead sheave having a pitch diameter terminating at the second axis, and the second axis lying on a line generally tangent to the winch drum.

The advantage of using a fairlead sheave having a pitch diameter terminating at the second axis and aligning the second axis generally tangent to the winch drum is that pivotal movement of the fairlead sheave about the second axis because of the angularity of the incoming cable does not affect the lead of the cable as it is spooled or removed from the drum. Thus each successive wrap is laid adjacent the previous one.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side elevation of a fairlead carriage embodying the principles of the invention.

FIG. 2 is a front elevation of the fairlead carriage shown in FIG. 1.

The fairlead carriage **10** includes a fairlead sheave **12** rotatably mounted between a pair of spaced ears **16** and **18** of a sheave mounting bracket **14**. The bracket also includes a central body joining the ears with a central cable-opening **15** for free passage of the cable C between the ears. A pivot post **20** extends upwardly from the central body and a lower tubular pivot post **22** extends downwardly therefrom. The hollow interior **23** of the lower pivot post is provided for free passage of the cable therethrough.

Guide collars **24** and **26** pivotally receive the pivot posts **20** and **22** respectively. The bearing guide collars are joined by suitable fasteners to a plate **28** so that they move as an integral unit. The guide collars are slidable mounted on level-wind guide bars **29**. A hydraulic cylinder or a suitable conventional lead screw is used to reciprocate the fairlead carriage along the guide bars **29**. In the embodiment shown a cylinder **30** is pivotally connected to the winch frame. A control mechanism **34**, substantially identical to that shown in U.S. Pat. No. 3,458,153 is provided to operate the hydraulic cylinder for reciprocating the fairlead carriage in timed relation with the wrapping of the cable on the winch drum WD in a manner well known in the art.

It is important in understanding the invention to understand the locations of the various active elements of the fairlead carriage. Fairlead sheave **12** rotates about a first axis **50** which lies in a plane parallel to the winch drum axis of rotation **51**. The sheave mounting bracket **14** pivots about a second axis **52**. The fairlead sheave pitch diameter PD terminates at axis **52** so that the cable C on the fairlead sheave coincides with this axis. As best shown in FIG. **1** the second axis **52** is generally tangent to the spool of the winch drum WD. Acutally the axis **52** lies along a line approximately midway between the empty spool (point a) and the rim of the spool (point b). Thus, since for most of the operation of a winch the cable wraps are between the extremes of points a and b, the axis **52** can be considered tangent to the actual wraps of cable on the drum. Since the pitch diameter PD of the fairlead sheave terminates at the axis **52** and the sheave mounting bracket pivots about this axis it can be seen that regardless of the angularity of the fairlead sheave about the second axis **52** caused by the direction of the incoming cable C, the cable going to the winch drum will not be displaced laterally but will be guided straight down alongside the previous wrap of cable on the drum. As a result of the axis location there will be very little contact with the flanges or rims of the fairlead sheave as the cable is wrapped on the drum thus reducing the amount of wear on the cable. At the same time the cable coming to the fairlead sheave from the remote location will be free to pivot the fairlead sheave about the second axis **52**, i.e., the sheave will follow the cable, to again reduce the amount of contact between the fairlead sheave flanges and the cable thus again reducing wear.

While the preferred form of the invention has been illustrated and described it should be understood that various modifications and substitutions will be apparent to one skilled in the art. It is to be understood, therefore, that the invention is to be limited only by the terms of the claims appended hereto.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A fairlead carriage for a level wind winch mechanism having a winch drum rotatable about an axis and means for moving said fairlead carriage along the winch drum in timed relation with the wrapping of a cable on the drum, the fairlead carriage comprising a fairlead sheave, over which the cable passes to said drum first mounting means for mounting the sheave for rotation about a first axis parallel with said drum axis,

second mounting means for mounting the fairlead sheave for pivotal movement about a second axis, said fairlead sheave having a pitch diameter terminating at said second axis, and said second axis lying on a line generally tangent to the winch drum whereby pivotal movement of said fairlead sheave about said second axis will not laterally displace the cable to the winch drum passing over the fairlead sheave.

2. The carriage of claim 1 said first mounting means including a sheave mounting bracket and said second mounting means including means for mounting said sheave mounting bracket for pivotal movement about said second axis.

3. The carriage of claim 2 said sheave mounting bracket having a pair of spaced ears defining an opening around said fairlead sheave, said second mounting means including a pair of spaced front and rear guide collars and pivot posts on said ears and pivotally mounted in said guide collars.

4. The carriage of claim 3 said means for moving said fairlead carriage along said winch drum including guide bars positioned parallel to the axis of rotation of the winch drum, said guide collars being slidably mounted on said guide bars.

5. The carriage of claim 3 said pivot posts including a first pivot post remote from said winch drum and a tubular second pivot post adjacent the winch drum, the hollow interior of said second pivot post providing an opening for free movement of the cable therethrough.

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