ABSTRACT

An end stop is associated with an elongated link type load chain in order to prevent a loose end of the chain from running through a hoist. The end stop includes a standard chain end link held sidewise or horizontally within the next to the last or vertically disposed link of the load chain by legs of a pull link; the pull link serving to define a convenient finger grip to facilitate manual pulling down on the loose end of the load chain.

6 Claims, 4 Drawing Figures
LOAD CHAIN LOOSE END STOP

SUMMARY OF THE INVENTION

The present invention relates to an improved end stop for preventing the loose end of a load chain from running through a hoist of the type having a guide device defining an opening for controlling passage of the chain through the hoist with the chain links in an end to end relationship.

In accordance with the preferred form of the present invention, a pull link is fixed to the last link of an elongated link type load chain so as to maintain the last link of the chain in a sidewise or horizontal position within the next to the last or vertical link of the load chain. The ends of the last link are thereby arranged to engage with the surface of the guide device adjacent the guide opening in order to prevent passage of the loose end of the chain therethrough. The pull link additionally defines a loop to facilitate manual pulling down on the loose end of the load chain.

Advantages of the present end stop are that no welding operation is required to attach the pull link to the loose end of the chain; that the pull link may be of relatively light weight, low cost construction and designed to facilitate gripping by the hoist operator, since the last link of the chain serves as the pull-through stop element and does not require any separate assembly operation; and that there is no possibility of the end stop becoming wedged in the chain guide of the hoist. Moreover, advantage is taken of the fact that the last link of the chain, which is used as the through stop element, is of high strength material and when of welded "continuous" construction will not pull apart or separate from the remainder of the chain under repeated loadings, thereby to provide for safety of operation.

DRAWINGS

The nature and mode of the present invention will now be more fully described in the following detailed description taken with the accompanying drawings wherein:

FIG. 1 is a view illustrating the end stop of the present invention applied to the free end of the link type load chain passed through a conventional hand operated hoist or puller;

FIG. 2 is a perspective view of the end stop;

FIG. 3 is a front elevational view of the end stop; and

FIG. 4 is a fragmentary-sectional view taken generally along line 4—4 of FIG. 3.

DETAILED DESCRIPTION

Reference is now made particularly to FIG. 1, wherein the end stop of the present invention is generally designated as 10 and shown being associated with the loose or non-lifting end of a conventional elongated link type load chain 12, which is passed or threaded through a conventional, manually operated hoist or puller 14 and carries a lift hook 16 adjacent its other end or load lifting end.

For purposes of reference, load chain 12 is shown as having standard, uniformly sized, welded links 18 interfit within openings 20 of adjacent links. As best shown in FIG. 3, each opening 20 has a width w, which is normally slightly in excess of the diameter D of the stock material from which the links are formed and a length l, which is normally slightly less than three times the link diameter D. Thus, the overall length L of each link is substantially in excess of its width W.

Also, for purposes of reference, hoist 14 is shown as generally including a hoist body 22, which encloses a chain link engaging sheave, not shown; a chain guide 24, which is formed with guide openings designated as 26 only in FIGS. 2 and 4 for guiding chain 12 into and out of running engagement with the sheave; and a manually manipulatable handle 28 for controlling load chain translating rotations of the sheave. Guide openings 26 are normally of clover-leaf shape configuration, as best shown in FIG. 4, and have maximum opening dimensions W', which are intermediate the values of chain link dimensions W and L. Thus, guide openings 26 serve to constrain passage of links 18 therethrough unless they are arranged in lengthwise or end to end relationship and adjacent links are disposed in an essentially perpendicular relationship.

End stop 10 is shown in FIGS. 1—3 as including a pull link 30, which is fixed to a last or end link 18a of the loose end portion of chain 12 in order to maintain same in a sidewise or horizontal position relative to the next to last vertically disposed link 18b. Pull link 30 includes an enlarged looped intermediate portion 32, which is integrally formed with a pair of essentially parallel legs 34 and 34'. Looped upper portions 34a and 34'a of legs 34 and 34' extend outwardly from the plane of loop portion 32 and pass through the opening 20a of end link 18a to lie adjacent opposite sides of the next to last link 18b. Upper portions 34a and 34'a terminate in free end portions 34b and 34'b, which are spaced from legs 34 and 34' a distance less than link diameter D in order to retain link 18a locked within leg portions 34a and 34'a. As will be apparent, the stock material from which pull link 30 is formed is less than about one diameter D in order to permit receipt of both leg portions 34a and 34'a and next to last link 18b within link opening 20a.

During use of hoist 14, engagement of opposite ends of link 18a with the lower surface of guide chain 24 adjacent guide opening 26, as indicated in phantom line in FIG. 3 and full line in FIG. 4, serves to prevent unintentional running of the loose end of load chain 12 through the hoist. Cooperation of leg portions 34a and 34'a with link 18b serves to constrain link 18a to extend horizontally substantially equal distances in opposite directions relative to the vertical plane in which link 18b is disposed and to lie within a vertical plane arranged perpendicular to the plane of link 18b. This prevents wedging or jamming of link 18a within guide opening 26 and insures substantially simultaneous engagement of the opposite ends of link 18a with the lower surface of guide 24, thereby to prevent the application of unbalanced bending or shear stresses to link 18a and/or 18b. At all times, loop portion 32 provides a convenient finger grip for the operator of the hoist when desired to manually raise lift hook 16. As will be appreciated from the foregoing and the phantom line shown in FIG. 3, end stop 10 normally extends from link 18a only in a direction away from link 18b, such that it does not itself engage guide 24 or interfere with the engagement of such guide by link 18a.

While in the preferred form of the present invention, pull link 30 is attached to the standard end link of the load chain such that the end link is incorporated as an integral part of the end stop, it will of course be appre-
cated that it would be possible to provide a composite end stop unit including a standard chain link, which would then be attached to the loose end of a load chain in a desired manner. This latter embodiment may well be preferred when the standard end link must be formed of a different metal from that employed in forming the load chain for any reason, such as to withstand repeated engagements with the chain guide of the hoist without deformation. Also, it will be appreciated that the present end stop possesses utility for non-hoist applications where it is desirable to prevent running through of a link chain.

1. In a device including a guide having an opening for controlling passage of an elongated link type chain through said device such that adjacent links of said chain are arranged end to end and in an essentially perpendicular relationship, and an end stop for preventing an end of said chain from running inwardly through said guide opening, the improvement wherein said end stop includes:

   means locked to a last link of said end of said chain for maintaining said last link sidewise relative to a next to last link of said chain, whereby ends of said last link are disposed to engage said guide adjacent said opening to prevent passage of said end of said chain inwardly therethrough, said means normally extending from said last link only in a direction away from said next to last link whereby only said last link engages said guide.

2. The improvement according to claim 1, wherein said means locked to said last link additionally defines a pull portion manually operable by an operator of said device to facilitate pulling of said end of said chain outwardly through said opening.

3. The improvement according to claim 1, wherein said means fixed to said last link includes an interme-

ate portion having a pair of leg portions extending therefrom, said leg portions extending through said last link adjacent opposite sides of said next to last link and being looped to lock said last link therewithin, and said intermediate portion defining a pull loop for receiving the fingers of an operator of said device to facilitate pulling of said end of said chain outwardly through said opening.

4. The improvement according to claim 3, wherein said leg and intermediate portions are of integrally formed construction.

5. The combination of a link chain and an end stop fixed to an end portion of said chain for preventing running of said end portion inwardly through an essentially clover-leaf shaped opening of a chain guide of a device with which said chain is associated, said end portion including an elongated last link having an end to end dimension in excess of the dimension of said opening, and said end stop includes a pull link to be gripped by an operator of said device to facilitate manual pulling of said end portion outwardly through said opening, said pull link having means for locking said pull link to said last link for maintaining said last link in a sidewise relationship relative to a next to last link of said chain thereby to position opposite ends of said last link for engagement with said guide adjacent said opening to prevent running of said end portion inwardly through said opening, said means and said pull link normally extending from said last link only in a direction away from said next to last link whereby only said last link engages said guide.

6. The combination according to claim 8, wherein said means includes a pair of members passed through said last link adjacent opposite sides of said next to last link and being looped to lock said last link therewithin.

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