Sept. 25, 1945. H. D. ALLERTON 2,385,338

MEANS FOR FORMING SLINGS TO HANDLE MATERIAL

Filed Sept. 11, 1943

Fig. 1

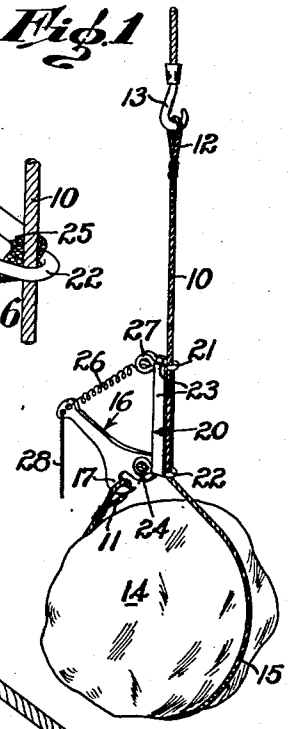


Fig. 2

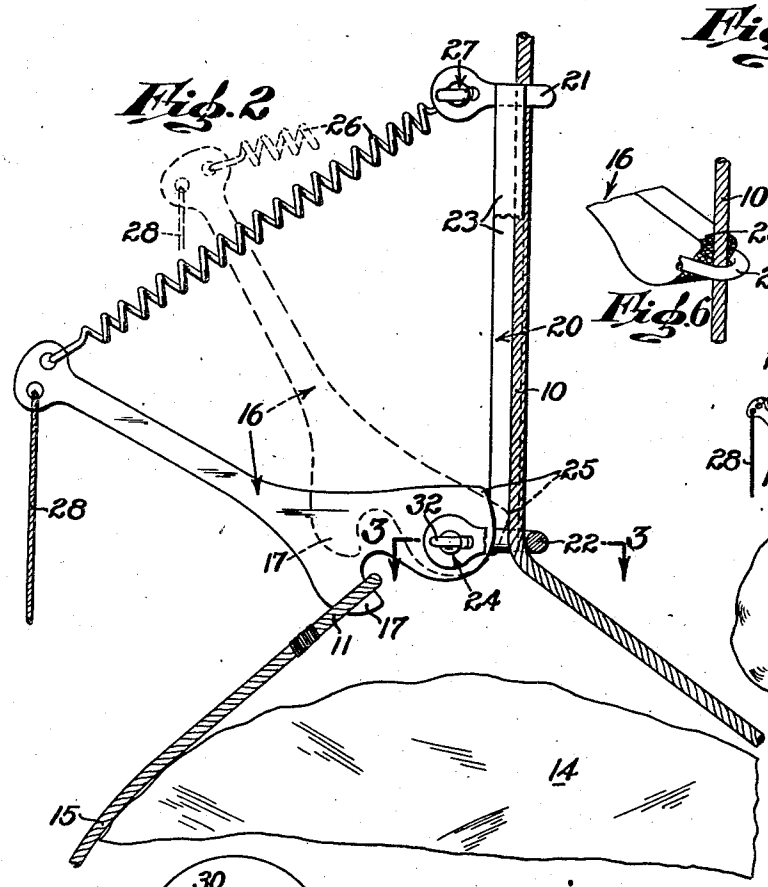


Fig. 6

Fig. 5

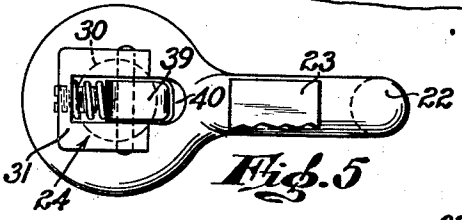


Fig. 4

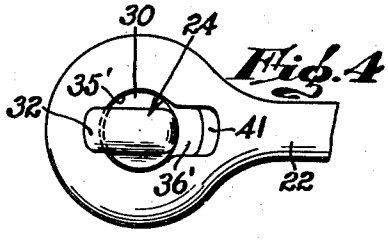
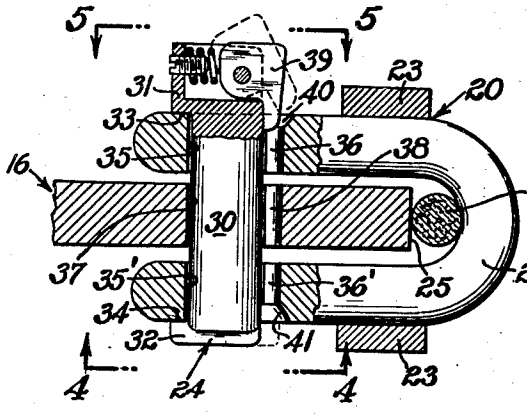


Fig. 3



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MEANS FOR FORMING SLINGS TO HANDLE MATERIALS

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Application September 11, 1943, Serial No. 502,038

6 Claims. (Cl. 294—75)

This invention relates to slings or loops which are formed by a cable or similar flexible element around large and heavy irregularly shaped objects, which it is desired to move, for example, boulders or large pieces of rock such as are used in building breakwaters or the like; more particularly the invention relates to the means by which such loops are readily and conveniently formed.

It is known to provide a lever-like member which is pivotally supported on a cable with which it is desired to form a loop or sling, this member being provided with a hook for receiving an eye formed on the free end of the cable after the cable has been passed about the object to be handled. This hook and lever are so related to the point of support on the cable that tension in the cable due to lifting the load acts to maintain the lever in loop forming position. It will be obvious that to accommodate various sizes of loads, and to avoid excessive strains in the cable the pivotal support must be adjustable along the cable. When the load is placed, the tension in the cable is released, permitting removal of the cable eye from the hook. In the prior art devices, no means were provided to restrain movement of the lever member along the cable after being disconnected from the loop. Consequently the lever would slide along the cable in an erratic manner as the cable moved, or it would slip entirely off the free end of the cable, frequently becoming lost, or in any case causing a loss of time while it was replaced on the cable.

It is accordingly an object of this invention to provide an apparatus of this character in which the lever is secured against movement along the cable when in unlocked or free position.

It is another object of this invention to provide a lever and hook of this character so arranged as to be automatically held against movement along the cable upon release of the tension in the loop.

It is still another object of this invention to provide a lever and hook mounting which is arranged to be optionally movable along the cable, but is arranged to be automatically locked against such movement upon release of tension in the loop.

Hook levers of the character just described are commonly mounted on a pin passing between the arms of a clevis or shackle embracing the cable, the pin threading into the clevis. Such threads are apt to rust and stick, making the pin difficult to remove and replace, and are also subject to rapid wear. It is thus another object of this invention to provide a pin having means for firmly securing it in place, which means permits ready removal of the pin and is operable in response to a fractional turn of the pin.

This invention possesses many other advantages and has other objects which may be made more easily apparent from a consideration of one embodiment of the invention. For this purpose there is shown a form in the drawing accompanying and forming part of the present specification. This form will now be described in detail, illustrating the general principles of the invention; but it is to be understood that this detailed description is not to be taken in a limiting sense, since the scope of the invention is best defined by the appended claims.

Referring to the drawing:

Figure 1 is a pictorial view showing a loop or sling supporting a load;

Figure 2 is a fragmentary elevation on an enlarged scale of the means by which the loop is formed;

Figure 3 is a detail section as seen substantially on line 3—3 of Figure 2;

Figures 4 and 5 are elevations respectively of the opposite ends of the clevis pin of Figure 3; and,

Figure 6 is a fragmentary pictorial view showing an operative feature of the device.

Referring to Figures 1 and 2 of the drawing, a length of cable is indicated by 10 and is shown as provided with means forming eyes or loops 11 and 12 respectively at its ends. One of these eyes as 12 is engaged by a crane or derrick hook 13, movable in a well known manner, and providing means by which a load 14 attached to the cable 10 may be manipulated. Or the cable 10, instead of a separate piece, may be the end portion of the crane or derrick cable or line; and the eye or eyes may be spaced if preferred from the end of the cable. As a means of securing the cable 10 to the load 14, which may be of irregular configuration, such for example as a large piece of rock, the lower portion of the cable 10 is formed as a sling 15 about the load.

To facilitate the placing of the sling 15 about the load 14 and its removal therefrom, as well as to accommodate the sling to various sizes of loads, a lever member 16 is adjustably mounted on the cable 10 so that it may be positioned above the load, and has a projection or hook 17 for receiving the eye 11. It will be apparent that tension in the cable 10 will be transmitted through

the sling 15 tightening the sling about the load 14 and urging the lever 16 to swing downwardly about its support on the cable, causing the loop 11 to remain securely in place on the projection 17. As long as the tension is maintained on the cable 10, the sling is retained firmly about the load 14. However, upon release of such tension as upon disposal of the load 14, the sling 15 is relaxed, allowing the eye 11 to be removed readily from the hook 17.

To permit slings of different sizes to suit various loads to be formed conveniently, the lever member 16 is freely movable along the cable 10, tension in the cable and the sling, as just mentioned, being relied on to maintain the hook in place during use. Under such a condition, when the sling 15 is released, the lever 16 falls to the lower portion of the cable 10, and frequently comes entirely off the cable. This may result in injury to the men using the sling, and in any case requires the replacement of the lever in appropriate position on the cable. Or the lever assembly may be lost in the spaces between the rocks being handled, or possibly in adjacent water as where a breakwater is under construction.

In the present case, the lever 16 is arranged to automatically lock against movement on the cable upon release of tension in the cable. Thus, a frame 20 formed of an upper and a lower clevis or shackle 21 and 22 joined by spaced parallel bars 23 is provided, a clevis pin 24 in clevis 22 pivotally supporting the lever 16 on the frame. The cable 10 passes freely through the clevises 21 and 22, so that the frame 20 is movable on the cable 10. To check such movement, the lever 16 has an eccentric or cam portion 25 which upon upward movement of the lever to the broken line position of Figure 2 cramps the cable 10 against the back of the clevis 22, as shown in Figure 6. A tension spring 26 extending between a pin 27 in the upper clevis 21 and the end of lever 16 urges the lever 16 to clamping position.

To facilitate handling of the lever 16 and particularly to release it from clamping the cable 10, so that the lever 16 and the frame 20 can be lowered to within easy reach without the need of lowering the derrick hook 13, a line 28 of suitable length is attached to the lever 16.

Either or both clevis pins 24 and 27 may be of novel form to permit their easy removal and replacement. Referring to Figures 3, 4 and 5, it will be seen that the pin comprises a cylindrical body 30 having a head 31 at one end and a key 32 at the opposite end. The head 31 and key 32 have opposed spaced faces 33 and 34 respectively which cooperate with the outside surfaces of the clevis 22 to maintain the pin 24 against axial movement. Aligned pin holes 35 and 35' in the clevis 22 are provided with aligned key ways 36 and 36' respectively, to accommodate the key 32 during insertion or removal of the pin 24. Similarly, a hole 37 in the lever 16 is provided with a key way 38. A spring pressed detent 39 is mounted in the head 31 and engages a suitable notch 40 in the adjacent surface of the clevis 22. As shown, by appropriate angular relationship of the key 32 and the detent 39, the notch 40 may be formed conveniently as part of the key way 36. By providing a similar notch 41 on the other side of the clevis 22, the pin 24 may be inserted optionally from either side.

To insert the pin 24, for assembling the lever 16 and the frame 20, the lever 16 is first placed between the arms of the clevis 22 with the hole 37 and key ways 38 in alignment with the holes 35, 35' and keyways 36, 36' of the clevis. The body 30 of the pin 24 is then axially aligned with the holes in the clevis and lever and the key 32 is aligned with the key ways in these members. The pin 24 is then slid axially through the aligned holes until the head 31 engages the clevis, the detent 39 being swung to the broken line position of Figure 3 to permit such movement. The pin 24 is then turned about its axis to align the detent 39 with the notch 40, and the detent is then released to engage the notch. This turning movement brings the key 32 out of alignment with the keyway 36'. Thus, the pin is prevented from moving axially in either direction. Furthermore, the engagement of the detent 39 with the notch 40 prevents realignment of the key 32 and keyway 36'. When it is desired to remove the pin 24, the keyway in the lever 16 is aligned with the keyways in the clevis. The detent 39 is swung clear of the notch 40 and the pin is turned to align the key 32 and keyway 36', whereupon the pin may be readily removed by axial movement in an upward direction from the position shown in Figure 3.

I claim:

1. A clevis pin having a head on one end and a projecting key adjacent the other end with a face opposing and axially spaced from said head, said pin being adapted for cooperation with a hole having a keyway through which the key is adapted to pass, angular movement of the pin in the hole serving to misalign said key and keyway, whereby the face of the key and the head serve to prevent axial movement of the pin, and a spring operated detent carried by said head for releasably maintaining the pin against movement to align the key and keyway.

2. In apparatus for forming a sling from a flexible element, a frame adapted to slidingly engage said element, a lever pivotally mounted on said frame and having a hook adapted to engage the flexible element at a point remote from that portion of the element engaged by said frame, said hook cooperating with the frame to form a load carrying bight of that portion of the element between the frame and the hook, a cam surface on said lever for clampedly engaging said element in response to movement of said lever in one direction about its pivot, to restrict relative movement between said frame and said element, and means urging said lever in clamping direction, said hook being so positioned on said lever with respect to said cam, that force exerted on the hook by said element in response to a load in said bight opposes movement of said lever in clamping direction.

3. In apparatus for forming a sling from a flexible element, a frame adapted to slidingly engage said element, a lever pivotally mounted on said frame and having a hook adapted to engage the flexible element at a point remote from that portion of the element engaged by said frame, said hook cooperating with the frame to form a load carrying bight of that portion of the element between the frame and the hook, a cam surface on said lever for clampedly engaging said element in response to movement of said lever in one direction about its pivot, to restrict relative movement between said frame and said element, means urging said lever in clamping direction, said hook being so positioned on said lever with respect to said cam, that force exerted on the hook by said element in response to a load in said bight opposes movement of said lever in clamping direction, said lever being optionally

movable in a direction opposite to clamping direction for causing said cam to release the element when the hook is not engaged by the element, whereby to permit relative movement between the frame and the element.

4. In apparatus for forming a sling from a flexible element, a frame adapted to slidingly engage said element, a lever pivotally mounted on said frame and having a hook adapted to engage the flexible element at a point remote from that portion of the element engaged by said frame, said hook cooperating with the frame to form a load carrying bight of that portion of the element between the frame and the hook, a cam surface on said lever for clamping said element against the frame in response to movement of said lever in one direction about its pivot, whereby to restrict relative movement between said frame and said element, and spring means interposed between said lever and the frame urging said lever in clamping direction, said hook being so positioned on said lever with respect to said cam, that force exerted on the hook by said element in response to a load in said bight opposes movement of said lever in clamping direction.

5. In apparatus for forming a sling from a flexible element, an elongated frame adapted to slidingly engage said element at spaced points thereon, a lever pivotally mounted on said frame adjacent one of said points and having a hook adjacent the pivot adapted to engage the flexible element at a point remote from that portion of the element engaged by said frame, said hook cooperating with the frame to form a load carrying bight of that portion of the element between the frame and the hook, a cam surface on said lever for clamping said element against the frame in response to movement of said lever about its pivot in a direction to cause the free end of the lever to approach the frame, whereby to restrict relative movement between said frame and said element, and spring means tensioned between said free end of the lever and said frame at a point remote from said pivot for urging said lever in clamping direction, said hook being on the opposite side of the lever from said cam, whereby force exerted on the lever by said element in response to a load in said bight opposes movement of said lever in clamping direction.

6. A clevis pin having a head on one end and a projecting key adjacent the other end with a face opposing and axially spaced from said head, said pin being adapted for cooperation with a hole having a keyway through which the key is adapted to pass, angular movement of the pin in the hole serving to misalign said key and keyway, whereby the face of the key and the head serve to prevent axial movement of said pin, and a detent movably carried by said head for releasably maintaining the pin against movement to align the key and keyway.

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