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HOIST PULLEY AND ROPE GRIPPER

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This invention relates to a hoist pulley which may be used in connection with a crane, hoist, or as the pulley of the type suspended from a beam or other overhead support while lifting a heavy object.

It is one object of the invention to provide a block and tackle having a pulley wheel about which a rope or cable is trained and a clutch movable into and out of position for gripping engagement with the rope or cable but normally held out of gripping position.

Another object of the invention is to provide a block and tackle wherein the clutch is mounted within a housing or body serving as a guide for the cable and suspended from a yoke in which the pulley wheel is rotatably mounted.

Another object of the invention is to provide a block and tackle wherein the clutch is pivotally mounted in the housing and yieldably held in operative position by a spring engaging a pin projecting outwardly from the housing through a slot formed therein, there being also provided actuating means for the clutch of such nature that it may be controlled by a person standing on the ground or occupying the cab of a crane.

Another object of the invention is to so form the clutch that after it has been moved to operative position for gripping the cable, lifting pull upon the cable will cause the clutch to be moved to its inoperative position and allow the weight carrying end of the cable to move downward.

Another object of the invention is to provide a block and tackle wherein the housing through which the cable passes carries a lower yoke constituting a mounting for guide rollers engaged with flights of the cable and serving very effectively to maintain the flights of the cable in their proper positions as they pass through the housing.

Another object of the invention is to provide a block and tackle which is of all metal construction and very strong and durable.

The invention is illustrated in the accompanying drawings, wherein:

Fig. 1 is a side elevation of the improved block and tackle.

Fig. 2 is a view in elevation looking from the right of Fig. 1.

Fig. 3 is a sectional view taken vertically through the block and tackle.

Fig. 4 is a view similar to Fig. 3, showing the clutch moved into position for gripping the cable.

Fig. 5 is a sectional view taken transversely through Fig. 1 or Fig. 3, on the line 5—5 thereof.

Fig. 6 is a transversely sectional view taken on the line 6—6 of Fig. 4.

Fig. 7 is a sectional view taken vertically through a block and tackle of a modified construction.

Fig. 8 is a sectional view taken transversely through Fig. 7 along the line 8—8 thereof.

Fig. 9 is a fragmentary view showing a modified connection between the clutch and the pull line for actuating the same.

Fig. 10 is a perspective view of the shaft by means of which the clutch shown in Fig. 9 is mounted.

The pulley constituting the subject matter of this invention is intended for use in connection with a hoisting device such as a crane and it may be suspended from any overhead support and used as a block and tackle for raising heavy loads. An important feature of the improved pulley is the fact that there has been provided means for gripping the rope or cable and holding said cable against movement in a load-lowering direction. It will thus be seen that after the load has been elevated, the cable may be secured and the load suspended while it is being shifted into position where it is to be lowered.

It is also an important feature of the device that when the load is to be lowered or raised to a higher elevation, it is merely necessary to exert pull on the cable and the cable securing member will be released and permitted to return to inoperative or normal position. Therefore, it is not necessary to manually shift the cable securing device to release the cable as, when pull in a load raising direction is exerted upon the cable, the securing device will move to its normal inoperative position and the load raised or lowered.

This pulley has a casing preferably formed of strong sheet metal although other suitable material may be used. The casing is flattened and substantially oblong when viewed in top plan or cross section, as shown in Figs. 5 and 6, and has side walls 2 and 3 and arcuate edge walls 4.

A yoke 5 which is of inverted U-shape and formed from a strip of strong sheet metal, extends upwardly from the casing in straddling relation thereto with its arms riveted or otherwise firmly secured at their lower ends to the side walls of the casing. This yoke carries a hook 6 by means of which it is suspended from an overhead support 7 and between arms of the yoke is rotatably mounted a pulley wheel 8. The rope or cable 9...
is trained about the pulley wheel 8 with its flights extending through the casing 1 in close proximity to the edge walls thereof but normally clear of the edge walls, as shown in Fig. 3.

In order that the cable will be normally secured from the edge walls of the casing, there have been provided guide rollers 10 rotatably mounted in end portions of an open frame 11. This frame is formed from a metal band riveted or otherwise secured along the reduced lower end portions of the side walls of the casing with its ends projecting therefrom and the rollers disposed in such relation to the edge walls 4 that the cable will be guided through the casing in spaced relation to the edge walls, as shown in Figs. 3 and 5. By exerting pulling force on the flight 9 of the cable, a load to which the other flight of the cable is secured will be lifted. The band 11 not only serves as a mounting for the rollers 10 but also serves as a brace for reinforcement for the lower end of the casing.

When the load has been lifted to a certain height it is desired to hold it in this position. In order to do this there has been provided a securing member in the form of a metal block 12 disposed within the casing and rotatably mounted on a shaft 13, having its ends passing through the side walls 2 and 3 of the casing and secured by nuts 14. The intermediate portion of the shaft is squared, as shown in Fig. 6, so that the block through which this portion of the shaft passes will be fixed to turn with the shaft. A pin 15 projects from an upper corner portion of the block through an arcuate slot 16 formed in the side wall 3 of the casing and to this pin is secured one end of a spring 17. The other end of the spring is secured to the casing, as shown at 18, and tension of the spring yieldsly holds the block in the vertical inoperative position shown in Fig. 3. Upper and lower ends of the block have curved edge faces formed with teeth 19 for gripping the cable when the block is turned about its axis or pivotal mounting to the operative position shown in Fig. 4. When the block is turned to the operative position in which the teeth engage the two flights of the cable, pull exerted by the weight of the load will cause the block to be retained in gripping engagement with the cable and movement of the cable in a load lowering direction will be prevented. When it is desired to lower the load it is merely necessary to exert pull on the flight 9 of the cable and this will cause the block to be tilted toward its inoperative position and freed from the cable so that the spring may return it to inoperative position. As the pulley will be in an overhead position where the block cannot be turned by a person standing upon the ground, there has been provided a pull line 20 having its upper end secured to a ring 21 carried by the pin 15. This pull line is engaged with a guide roller 22 or small pulley 23 rotatably mounted between the side wall 3 of the casing and a bracket 24 carried thereby and is of such length that it may be grasped by a person standing on the ground or it may extend to a position in which it may be grasped by the operator of a crane equipped with the improved pulley. When the block is in the inoperative position, flights of the cable will be firmly gripped between the teeth 19 and the edge walls of the casing and firmly held, but when the block is in its operative position, the flights of the cable will be maintained in spaced relation to the edge walls of the casing by the guide rollers and frictional wear on the cable will be eliminated. In order to provide a firmer grip upon the cable, toothed strips 24 may be mounted vertically in the casing against the edge walls thereof, as shown in Figs. 7 and 8. The teeth of these strips are formed with teeth of the block to very firmly grip the cable. The strips 24 extend the full height of the arcuate edge walls 4 of the casing and reinforce these portions of the casing.

In Fig. 9 there has been illustrated a modified construction wherein the slot 19 is omitted and the shaft 25 carrying the block 12 has one end portion bent to form a crank handle 26. The spring 17 has its lower end connected with the crank handle and the ring 21 to which the pull 15 line is attached is also carried by the crank handle. In this form of pulley, pull upon the line 20 acts upon the crank handle to turn the shaft and cause the block to be tilted from its inoperative position to operative position in which teeth of the block will grip the cable.

Having thus described the invention, what is claimed is:

1. A hoisting tackle comprising a casing having side walls and edge walls and being open at its upper and lower ends, a yoke rising from said casing and secured to side walls of the casing, a pulley wheel secured to said yoke which holds cable over said casing whereby a cable may be trained over the pulley wheel with flights passing through the casing, a block rotatably mounted in said casing and having opposite end edges formed with teeth, one side wall of the casing being formed with an arcuate slot concentric to the axis of said block, a pin extending from said block outwardly through said slot, a spring secured to the casing and to the outer end of said pin and yieldably holding the block in vertical inoperative position shown in Fig. 3, and a pull line having one end connected with said pin, said pull line when drawn upon serving to exert pull on the pin and turn the block about its axis and dispose its teeth in position to clamp flights of the cable against the edge walls of the casing and secure the cable against movement in a load lowering direction.

2. A hoisting tackle comprising a casing open at its upper and lower ends and having opposed side and edge walls, a pulley wheel rotatably mounted above said casing, a block in said casing having a shaft rotatably mounted through the side walls of the casing, said block having projections adapted to grip a cable passed through the casing and trained about the pulley wheel when the block is turned from an inoperative position to an operative position, a pin extending from said block through an opening formed in a side wall of said casing, a spring anchored at one end and having its other end secured to said pin, a spring constituting means for yieldably holding said block in an inoperative position, and means connected with said pin for moving said block to an operative position.

3. A hoisting tackle comprising a casing open at its upper and lower ends and having opposed side and edge walls, a pulley wheel rotatably mounted above said casing, a block in said casing having a shaft rotatably mounted through the side walls of the casing, said block having edge portions formed with teeth for gripping a cable passed through the casing and trained about the pulley wheel when the block is turned from an inoperative position to an operative position, a side wall of said casing being formed with a slot, a pin extending from said block...
through said slot, a spring anchored at one end and having its other end engaging said pin and yieldably holding the block in inoperative position, and a pull line connected with said pin and constituting means for turning the block from inoperative position to operative position.

4. A hoisting tackle comprising a casing open at its upper and lower ends and having opposed side and edge walls, a pulley wheel rotatably mounted above said casing, a block in said casing having a shaft rotatably mounted through the side walls of the casing, said block having edge portions formed with teeth for gripping a cable passed through the casing and trained about the pulley wheel when the block is turned from inoperative position to operative position, an open frame for reinforcing the lower end of said casing secured along lower ends of the side walls transversely of the casing to reinforce the same and having U-shaped end portions projecting outwardly from the edge walls of the frame, guide rollers rotatably mounted in the projecting end portions of said frame in spaced relation to opposite edge walls of the casing for guiding movement of the cable through the frame, means for yieldably holding said block in inoperative position, and means for turning said block to an operative position.

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