

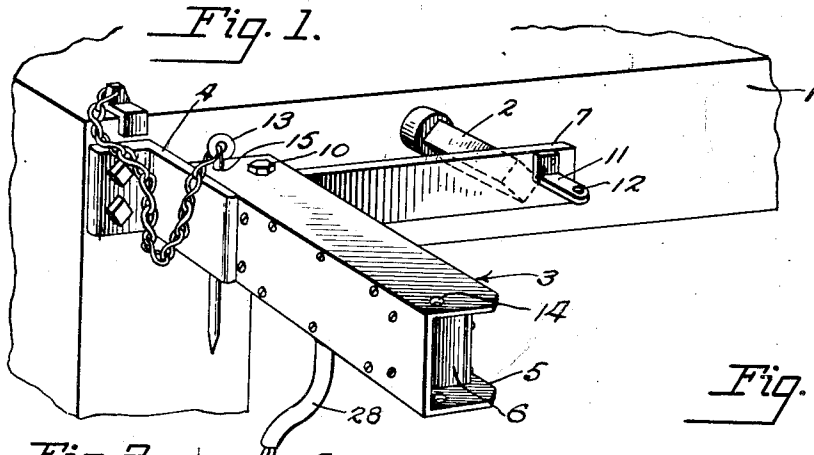
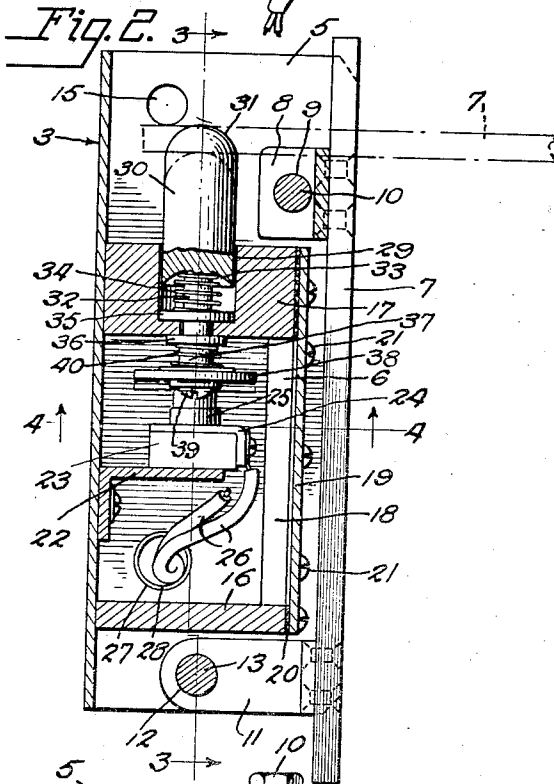
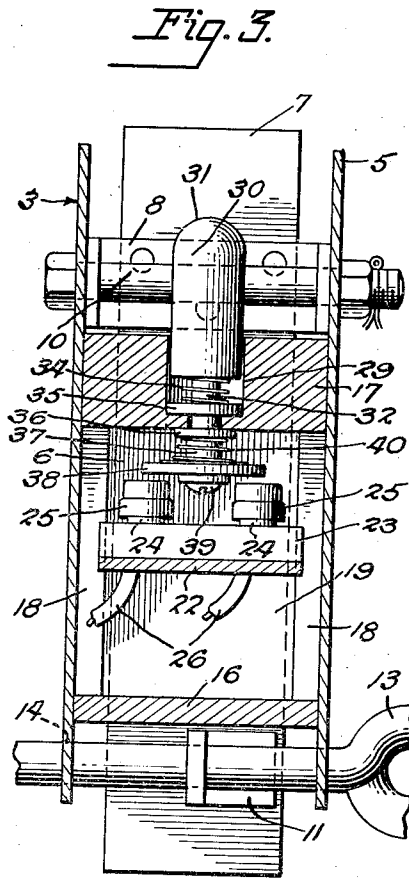
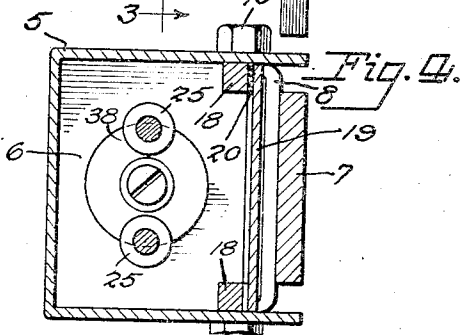
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SAFETY DEVICE FOR BOAT HOISTS

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SAFETY DEVICE FOR BOAT HOISTS

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1

This invention relates to safety devices and more particularly to devices of this character for use in association with dual operation hoists usually of the electro-mechanical type, such hoists being operable either electrically or manually at the option of the operator to suit specific conditions.

It is common to install electro-mechanical hoists on ships as part of the boat lowering and hoisting gear. The hoist is operated electrically by means of large powerful electric motors which lift the boat quickly from the water to the deck of the ship. Because of the speed with which these hoists operate, the hoist is usually stopped before the boat has reached its cradle. The boat is then lifted the short remaining distance by hand. For manual operation, a long, heavy crank is fitted upon a squared shaft projecting from the hoist frame and the crank is rotated by an operator using both hands, in the manner of any ordinary heavy windlass.

Care must be exercised when the hoist is to be manually operated, to guard against accidental starting of the motors. The motors, if started, will whip the heavy crank around, frequently crushing the skull of the operator or otherwise seriously injuring him.

The present invention contemplates the provision of a safety device to be applied to such a hoist which will permit the operation of the hoist either electrically or manually as desired, but when set for operation by one means will positively prevent operation by the other.

It is an object of the present invention to provide means to block the squared shaft of the hoist to render application of the crank impossible while the hoist is being electrically operated; with movement of the blocking means to free the shaft acting to disrupt the circuit to the motor to preclude electrical operation.

Another object of the invention is to provide such a device having locking means to hold the device in either of its two positions to ensure continuous operation by the means chosen.

A further object of the invention is to provide a safety device in the form of an attachment which may be secured to hoists of different makes and designs without the necessity for having a number of differently designed devices for different hoists.

Generally it is the object of the invention to provide a simple, practical safety device which is fool-proof in operation, economical to manufacture, and built for rugged use and long wear.

Other objects will appear from the following detailed description taken in the light of the drawing which accompanies and forms a part of this specification, and through the several figures of which like reference numerals are used to indicate identical parts.

2

In the drawing:

Figure 1 is a perspective view of a portion of an electro-mechanical hoist having attached thereto a safety device embodying the principles of the present invention, the safety device being set for electrical operation of the hoist, and blocking manual operation;

Figure 2 is a medial, longitudinal, horizontal section through the safety device shown in Figure 1, the device being set for manual operation of the hoist;

Figure 3 is a vertical, longitudinal section taken on the line 3-3 of the Figure 2; and,

Figure 4 is a vertical transverse section taken on the line 4-4 of Figure 2.

Referring to the drawing in detail, a portion of an electro-mechanical hoist is more or less diagrammatically shown in Figure 1. As the device of the present invention is adaptable to any hoist having dual operating means, only a portion of a hoist frame 1 is shown from which projects a squared shaft 2. The shaft 2 is provided with appropriate gears, not shown, and forms a part of the conventional hoist. The safety device is shown at 3 fixed to the frame of the hoist by means of a bracket 4.

The safety device comprises a channel member 5 which houses a switch box 6 and provides a pivotal support for a guard in the form of a locking bar 7. Locking bar 7 is in the form of a flat metal strip having a U-shaped bracket 8 riveted or otherwise secured to one face a short distance inwardly from the end of the bar. The bracket 8 is provided with openings 9 through which a pivot bolt 10 passes. The bolt 10 also extends through openings in the side flanges of the channel member 5 and pivotally secures the locking bar to the channel. The open end of the locking bar is provided with an extension 11 having an opening 12 to receive a locking pin 13, which may be dropped through openings 14 in the channel member and opening 12 in the projection 11 to hold the locking bar in its inactive position within the housing, extending substantially longitudinally of the housing. Another pair of openings 15 in the channel member provide means for holding the locking bar in its active or outward position. By slipping the pin 13 through the openings 15, the inner end of the locking bar bears against the shank of the pin and is securely held.

The switch box 6 is formed within the channel member by means of end plates 16 and 17 fixed transversely of the channel, bridging the space between the channel side flanges. These end members extend from the base of the channel down to a point short of the edges of the side flanges, leaving sufficient room between the flanges of the channel to receive the locking bar when it is in its inactive position within the

channel. Side strips 12 are fixed to the opposite channel flanges to form with the end plates a rectangular surface upon which a cover plate 19, provided with an underlying gasket 20, may rest. The cover plate is secured to the end pieces and the side strips by means of screws 21. This provides a waterproof compartment to house the switch.

An angle bracket 22 is screwed to the base of the channel and forms a support for a fiber base 23 upon which the stationary terminals 24 are placed. Each of the terminals 24 carries a fixed carbon contact 25 which may be screwed or otherwise attached to the terminals. Lead wires 26 forming part of the motor circuit are attached to the terminals and pass out of the safety device through an opening 27 in one side flange of the channel member which is tapped to receive a section of conduit pipe 28.

The switch box end piece 17 is provided with a well 29 to slidably receive the switch actuating plunger 30. Plunger 30 is preferably formed with a rounded head 31 and carries a depending pin 32 projecting from an arcuate recess 33 formed in the base of the plunger. A coil spring 34 surrounds the pin and has one end bearing against the inner portion of the recess 33, and its other end bearing against a gasket 35 seated in the bottom of the well. A fiber washer 36, which serves as a stop to limit the upward movement of the plunger 30, is seated against the end of the pin 32, and a sleeve 37 is in end contact with the washer 36. A movable switch contact 38 of sufficient size to bridge the contacts 25 slips over the sleeve 37, and a screw 39 passes through the sleeve 37 and washer 36, and threads into the pin 32 to complete the plunger and movable contact assembly. A spring 40 surrounds the sleeve 37, between the movable contact 38 and the washer 36, to provide the movable contact with a floating mount upon the sleeve 37.

The method of mounting this device upon a hoist is relatively immaterial, and the bracket 4 secured to the back of the channel member is merely one method which may be employed. It is only important that the safety device shall be so mounted that the locking bar 7 will lie directly in front of the crank shaft 2 of the hoist when the locking bar has been rotated to its outward or active position. This effectively blocks the end of the crank shaft and makes it impossible for the hoist operator to place the crank upon the crank shaft.

When the locking bar has been moved to its outward position, the locking pin 13 is dropped through the holes 14 to hold the bar in position. In reaching this position the locking bar rotates about its pivot 10 and the inner projecting end of the bar contacts the rounded head of the plunger 30, forcing the plunger inward against the tension of the spring 32. The contact 38 will be moved until it is in contact with, and bridges, the carbon points 25, any further movement of the plunger being compensated for by compression of the spring 40 permitting movement of the contact 38 on the sleeve 37. The contact 38 will be held firmly against the points 25 by the spring 30 and can tilt slightly about the sleeve 37 to ensure proper engagement with both contacts 25. When the locking bar is in this position, the switch is closed, completing a circuit to the electric motor so that the hoist can be motor operated.

When it is desired to operate the hoist manually, the pin 13 is withdrawn and spring 34 will immediately expand, forcing the plunger outward

and rotating the locking bar about its pivot. The locking bar is then rotated completely around until it is within the channel member and the locking pin inserted in the openings 14 and 12 to securely lock the bar in its inactive position. The outward movement of the plunger under the influence of the spring separates the switch contacts, breaking the circuit to the hoist motor.

It can thus be seen that when the switch contacts are closed to permit electrical operation of the hoist, the locking bar must be in its extended position, effectively blocking the crank shaft and preventing any possibility of a crank being used. On the other hand, as soon as the locking bar leaves its position in front of the crank shaft, the switch points are separated so that under no circumstances can the electric motors be started while the hoist crank shaft is unguarded.

While I have in the above disclosed what I believe to be a preferred and practical embodiment of the invention, it is understood that the invention is not limited to the specific form shown, but only as defined in the appended claims.

What I claim is:

1. A safety device for electro-mechanical hoists comprising, a housing, a locking bar pivotally secured to said housing, adapted to swing outwardly to a position blocking the operation of said hoist by mechanical means, a switch within said housing connected in the power line for electrical operation of the hoist, means adapted to be contacted by said guard to cause the switch to close when the locking bar is swung outward, and means to lock the locking bar in its inward and outward positions.

2. A safety device for electro-mechanical hoists comprising, a channel member, a locking bar pivotally secured to said channel member adapted to swing outwardly to a position blocking the operation of said hoist by mechanical means, a housing within said channel member, a spring pressed plunger protruding from said housing, a movable switch contact yieldingly carried by said plunger, fixed contacts within said housing connected in the power line for electrical operation of said hoist to be bridged by said movable contact, said plunger adapted to be actuated by said locking bar to cause the switch contacts to engage as the locking bar swings outward, and means to lock the locking bar in its inward and outward positions.

3. A safety device for hoists of that type having a connection to a power line for electrical operation and a shaft adapted to receive a crank for manual operation comprising, a guard adapted to move to a position in front of said shaft to prevent the application of said crank, a switch connected in said power line, and means adapted to be contacted by said guard to close said switch when the guard is in front of said shaft and open the switch when the guard is not in front of said shaft.

4. A safety device for electro-mechanical hoists comprising, a guard adapted to move to a position blocking the operation of the hoist by mechanical means, a switch connected in the power line for electrical operation of said hoist, means adapted to be contacted by said guard to close the switch when the guard is in its blocking position and open the switch when the guard leaves its blocking position, and means to lock the guard in each of its positions.

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