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CABLE SAFEGUARD

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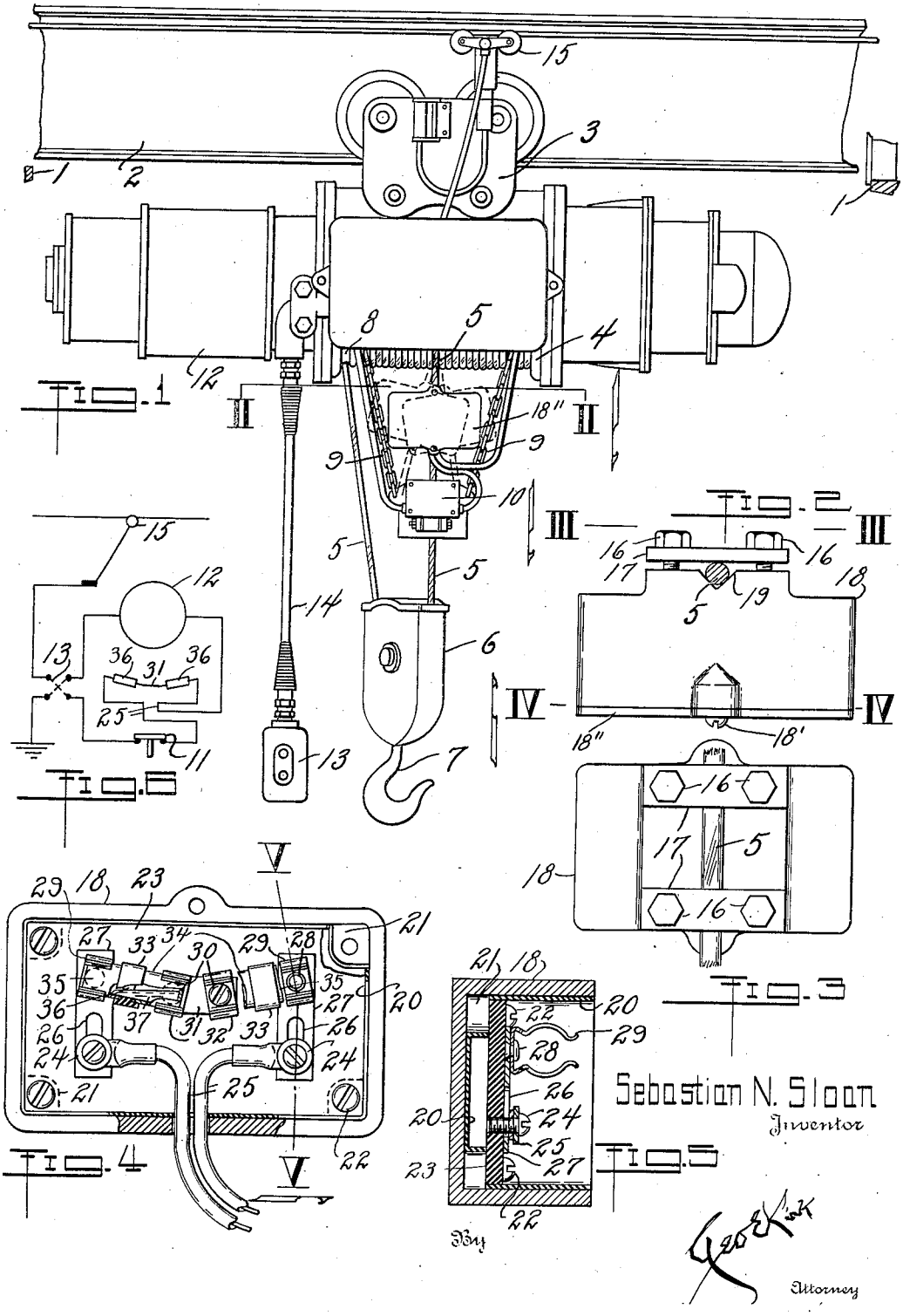


FIG. 1

FIG. 2

FIG. 3

FIG. 4

FIG. 5

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CABLE SAFEGUARD

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5 Claims. (Cl. 254—173)

The invention relates to the maintenance of a vertical direction of cable travel in a plane from a point or axis.

This invention has utility when incorporated in draft or line cables for telpherage or in hoisting and power shifting and lifting of work, more particularly with the bridge type of crane having a power operated cable drum thereon, wherein such power may be cut out automatically when the direction of the cable approach slants to the drum axis beyond a minimum from the perpendicular to such axis.

Referring to the drawing:

Fig. 1 is a view, with parts broken away, showing an embodiment of the invention in a bridge type of crane;

Fig. 2 is a section on the line II—II, Fig. 1, showing the control box for the tiltably operable cut-out switch herein;

Fig. 3 is a view on the line III—III, Fig. 2, of this box-housed switch;

Fig. 4 is a view generally on the line IV—IV, Fig. 2, showing the mercury switch devices in the control box;

Fig. 5 is a section on the line V—V, Fig. 4, showing the mounting of the clip for a switch terminal; and

Fig. 6 is a wiring diagram of the control.

Along tracks 1 bridge 2 may be shifted as by power means from a remote operator. This bridge 2 mounts carriage 3 of a hoist having drum 4. Fixed with this carriage 3 is one end of cable 5 passing about block or connector 6 having load-engaging hook 7, and then back into grooved ways 8 in the drum 4. A cut-out switch housing 10 is suspended from carriage 3 by chains 9 and is fixed to cable 5 at a point spaced from the carriage 3. There is thus provided a control against excessive rise of the block 6, for as such block strikes this box 10 or too closely approaches thereto, cut-out switch 11 defeats driving operation of motor 12. As herein disclosed, there is push control switch 13 having flexible drop 14 from the carriage 3. Power supply to the carriage 3 may be from trolley 15.

In practice with the larger units, the switch 13 may be a reversing switch and the cut-out switch 10 in series therewith to effect cutting out of the power current to the motor 12. In smaller units where less power is used, these may be regularly in the supply or power circuit.

In the handling of loads the hook 7 may be moved in a plane perpendicular to the axis of the drum below bridge 2 as this does not cause damage to the equipment as the line of direction of cable 5 will approximately be in a plane perpendicular to the axis of the drum 4 or radial to drum 4. However, in practice, when the carriage 3 is shifted along the bridge 2, the work-engaging hook 7 may have a slant toward the drum 4. This means an out-of-normal line direction of draft for the cable 5 as to the grooves 8 in the drum 4. Such means an axial direction of extent for the cable 5 in its approach to or away from the drum 4. There is thus a tendency to crowd out of the groove or cross a wound portion of the cable. This, in the strand type of cable whether of wire or hemp type, has a tendency to fray or wear the cable unduly. There is thus a shortening of the cable life and the introduction of a hazard as to cable strength, which hazard may not only be that of equipment but as to the workmen. It is true the operator may readily shift the carriage 3 to bring the position of the block 6 to approach a plane perpendicular to the axis of the drum 4 for the line of direction of the cable 5. However, in normal functioning of work, unforeseen conditions or miscalculation by the operator may bring the block 6 into this disturbing relation as to the carrier and drum. An automatic safeguard is herein provided.

This safeguard against draft line slant toward a plane perpendicular to the axis of the drum comprises a cut-out. In this cut-out bolts 16 may draw plates 17 against cut-out box or housing 18 for notch 19 to grip the cable 5. The location is desirably at a position on the cable 5 or near the block 6. Bolt 18′ mounts closure plate 18″ on the housing 18. The switch 11 may maintain its normal functioning against attempt at too high a lift or lift too close to the carriage or carrier 3 for the block 6.

This block or housing 18 has therein insulation lining 20 with corner lugs 21 engaged by screws 22 in positioning insulation block 23 spaced from the under side of this box 18. This insulation block 23 has terminal screws 24 for lead-in connections 25. The screws 24 as engaging block 23 pass through slots 26 in conductor strips 27 which may be connected by rivets 28 in double pronged spring clips 29. These clips 29 are swiveled thereto. Between this pair of clips 29 there is fixed by screws 30 strap unit 31 carrying clips 32. A pair of the clips 29, 32, may be aligned to receive therein a fixture having medial insulation body 33 and terminal contact portions 34, 35, spaced by this insulation portion 33. This unit 33, 34, 35, has chamber 36 therein for mer-

cury 37, say along the type of Davis Patent No. 1,905,813, April 25, 1933.

The location of the fixed connector strap 31 is medial and the clips 32 are swiveled thereto, thus fixing as to the screws 30 an angle or position for this strap 31 as to the insulation block 23. However, the slots 26 in the strips 27 permit adjustment for the desired angle of sensitiveness for these automatic mercury switches to act. This action by the switches for cutting out or opening the circuit between the leads 25 is one which is not effected as the hook or block 6 may swing or be drawn in a plane approximating perpendicular to the axis of the drum 4. However, as such pull or swing position for the block as to the drum 4 in the lines of direction of the cable 5 thereto may be longitudinally of the axis for such drum 4, the disastrous condition of the cable lead may arise when the cable is led into or out from the drum. With such undesired condition determined, this switch may have its control adjusted to at once become effective on such tilt, herein shown by dotted lines in Fig. 1, as in the direction of the one strip 27 approaching the axis of the drum 4 and the other strip 27 receding therefrom. The mercury 37 is thus shifted in one or both of the chambers 36 to break the circuit between the leads 25. The motor 12 is thus cut out and the operator is now compelled to re-locate the block 6 or the carrier 3, which brings the line of pull more nearly to approximate the perpendicular plane to thereby safeguard the cable 5 from hazard.

What is claimed and it is desired to secure by United States Letters Patent is:

1. A direction limiting means for a suspended hoist cable comprising a winding drum, a cable suspended at one end from said winding drum and having its other end fixed, a load engaging means suspended by said cable, drive means for rotating said drum, a control circuit for said drive means, and an electrical device connected to the cable between the fixed end and said load engaging means and in said circuit to stop operation of said drive means on movement of said load engaging means along the axis of said drum but permitting movement of said load engaging means transverse to the axis of said drum.

2. In a bridge crane, a direction limiting means for a suspended hoist cable comprising a winding drum for the crane, a cable suspended at one end from said winding drum and having its other end fixed with the crane adjacent the drum, a load engaging means suspended by said cable, drive means for rotating said drum, a control circuit for said drive means, and an electrical device connected to the cable between the fixed end and said load engaging means and in said circuit to stop operation of said drive means on movement of said load engaging means along the axis of said drum but permitting movement of said load engaging means transverse to the axis of said drum.

3. A direction limiting means for a suspended hoist cable comprising a winding drum, a cable suspended at one end from said winding drum and having its other end fixed, a load engaging means suspended by said cable, drive means for rotating said drum, a control circuit for said drive means, and an electrical device connected to the cable between the fixed end and said load engaging means and in said circuit, said device being shiftable relatively to the drum to stop operation of said drive means on movement of said load engaging means along the axis of said drum but permitting movement of said load engaging means transverse to the axis of said drum.

4. A direction limiting means for a suspended hoist cable comprising a winding drum, a cable suspended at one end from said winding drum and having its other end fixed, a load engaging means suspended by said cable, drive means for rotating said drum, a control circuit for said drive means, and an electrical device connected to the cable between the fixed end and said load engaging means and in said circuit, said device including a switch tiltable relatively to the drum to stop operation of said drive means on movement of said load engaging means along the axis of said drum but permitting movement of said load engaging means transverse to the axis of said drum.

5. A direction limiting means for a suspended hoist cable comprising a winding drum, a cable suspended at one end from said winding drum and having its other end fixed, a load engaging means suspended by said cable, drive means for rotating said drum, a control circuit for said drive means, and a mercury switch connected to the cable between the fixed end and said load engaging means and in said circuit to stop operation of said drive means on movement of said load engaging means along the axis of said drum but permitting movement of said load engaging means transverse to the axis of said drum.

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