

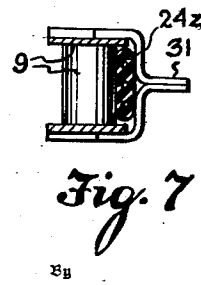
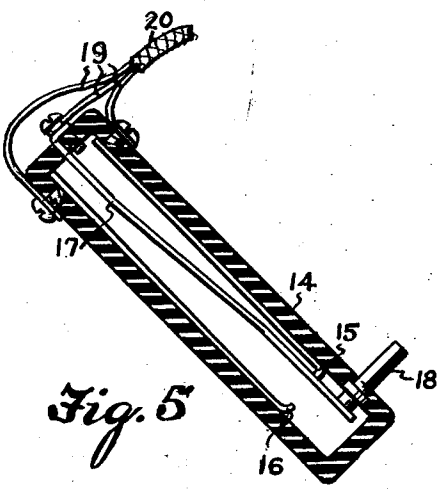
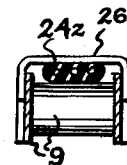
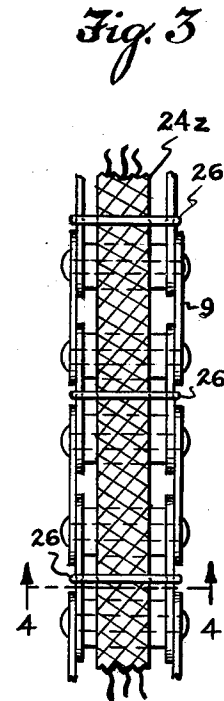
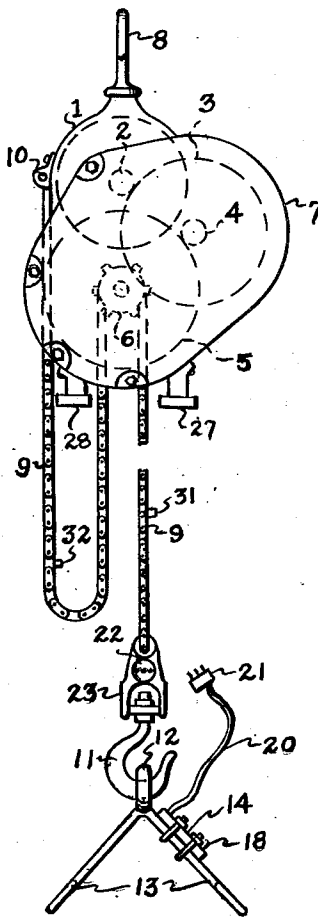
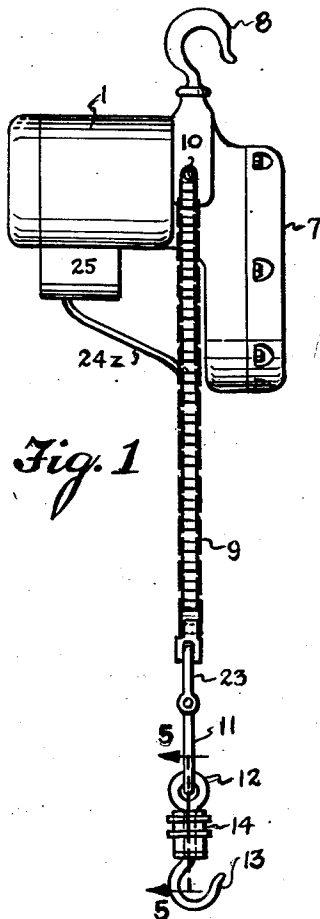
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J. P. LANNEN
ELECTRIC HOIST

2,600,887

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2 SHEETS—SHEET 1



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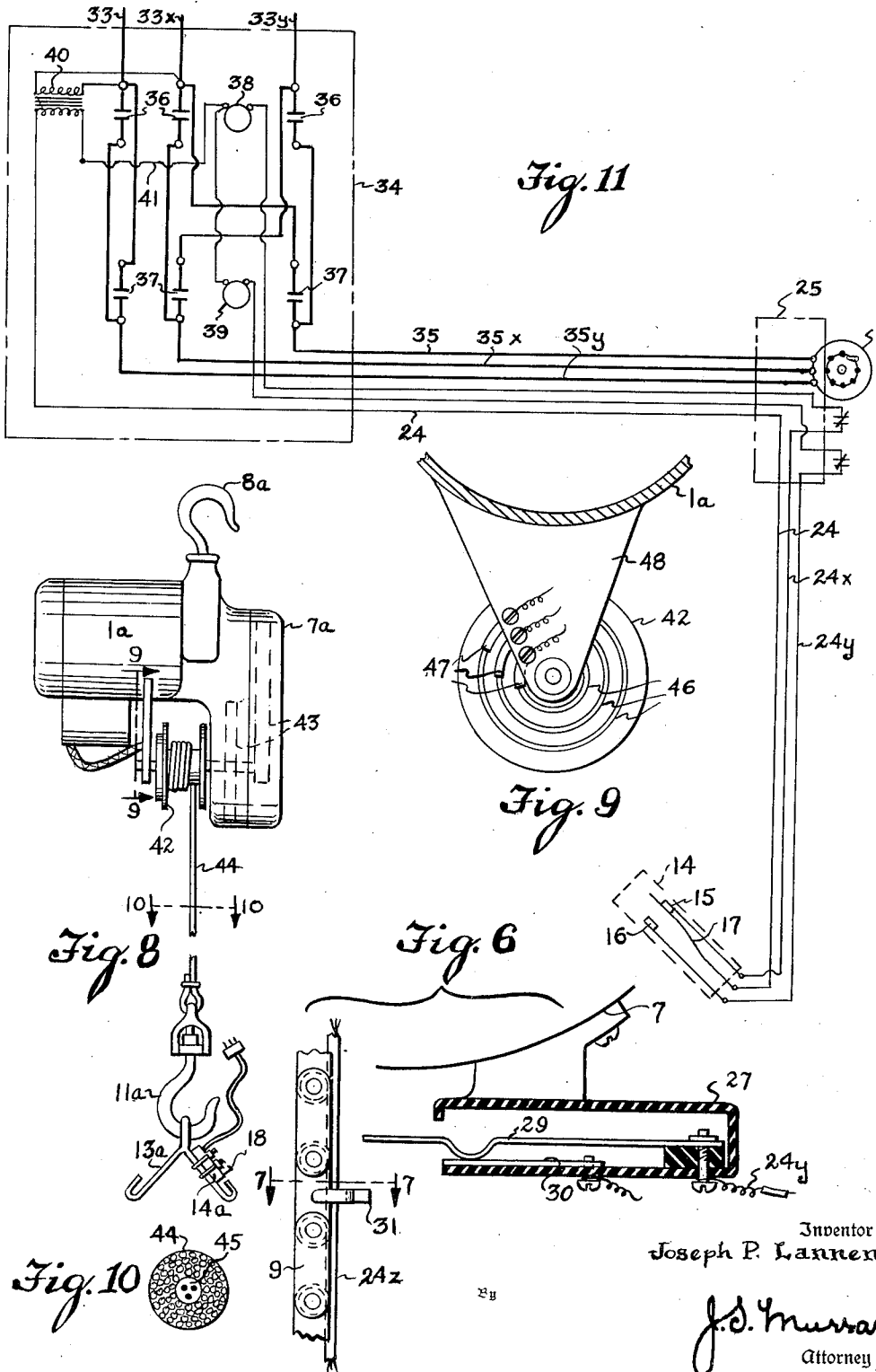
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2 SHEETS—SHEET 2



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UNITED STATES PATENT OFFICE

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ELECTRIC HOIST

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This invention relates to electric hoists and particularly controls for such hoists. In present practice, a switch box is carried by the hoist motor, the switch or switches therein being controlled by pull cords extending freely downward a definite distance. In loading or unloading such a hoist and guiding a load, the operator has one hand available for that purpose, the other being occupied with the pull cords, since one thereof must be under stress to keep the motor energized.

An object of the invention is to mount a motor control box on the load-carrying hook or its equivalent, or on the lift chain or cable in proximity to the hook, so that control may be exercised and the hook be manipulated by one hand of the operator, who may manipulate the load with his other hand.

In attaining the foregoing object, there is further derived the advantage that the point of manual control for the motor is always substantially at the point of loading or unloading, regardless of lift distance, the control being hence much more conveniently exercised than by pull cords.

Another object is to extend along the load-lifting chain or its equivalent, such insulated conductors as are essential to a manual control of the motor exercised at or closely adjacent to the hook or other load receiver.

Another object is to secure said conductors to a lift chain without interference with the requisite travel of the chain on a sprocket wheel.

These and various other objects are attained by the construction hereinafter described and illustrated in the accompanying drawings, wherein:

Fig. 1 is a side elevational view of an electrically operated chain hoist incorporating my improvements.

Fig. 2 is an end elevational view of the same.

Fig. 3 is a fragmentary view showing a portion of the lift chain and a conductor cord carried by such chain.

Fig. 4 is a cross sectional view of the same, taken on the line 4—4 of Fig. 3.

Fig. 5 is a sectional view taken on the line 5—5 of Fig. 1, showing the main control switch for the hoist.

Fig. 6 is a vertical sectional view of a switch for limiting upward travel of the load receiver, showing a control element for such switch on the lift chain.

Fig. 7 is a cross sectional view of said chain, particularly showing said control element, and taken on the line 7—7 of Fig. 6.

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Fig. 8 is a side elevational view of an electrically operated cable type of hoist, with my invention applied.

Fig. 9 is a fragmentary vertical sectional view taken on the line 9—9 of Fig. 8, particularly showing the cable drum and its mounting.

Fig. 10 is a cross sectional view of the lift cable of Figs. 8 and 9 taken on the line 10—10 of Fig. 9.

Fig. 11 is a diagram of the electrical connections of my improved hoist.

In these views the reference character 1 designates an electric motor, transmitting a drive through a train of speed-reducing gears 2, 3, 4, and 5 to a sprocket wheel 6. Said gears and sprocket wheel occupy a casing 7 having a unitary connection to the motor casing, the resulting unit being surmounted by a supporting hook 8. A roller type chain 9 has one of its ends exteriorly secured at 10 to the casing 7, and extends downwardly from such end 10 and then upwardly to the sprocket wheel, thus forming a slack suspended loop. Passing over the sprocket wheel, the chain extends downwardly a variable distance, terminating in a swivelly mounted load-receiving hook 11. The construction so far described is well known, my improved features being as follows:

The hook 11 is detachably engaged by an eyelet 12 formed on a double hook 13 or some other accessory load receiver best suited to a required job. Fixed on one of the shanks of the hook 13 is a main switch (see Fig. 5) comprising an insulating casing 14, spaced upper and lower contacts 15 and 16, and a spring arm 17 fixed at one end thereof and biased to normally engage the contact 15. A push button 18 engaging the free end of the arm 17 serves to disengage such end from the contact 15 and establish it either in a neutral mid position or in engagement with the contact 16. Three conductors 19 respectively connected to the respective contacts 15 and 16 and arm 17 lead through a suitable insulating cord 20 to a three-pronged plug 21 which is engageable with a three-socket receptacle 22 fixed on a mounting 23 attaching the chain 9 to the hook 11. Three conductors 24, 24x, and 24y incorporated in a suitable insulating cord 24z extend respectively from the respective sockets of the receptacle 22 along the chain 9, following the latter to a point adjoining its anchored end 10 and then leading off to a connection box 25 on the motor, as appears in Fig. 1.

The cord 24z engages that face of the chain which clears the sprocket wheel 6 and is straddled by and held to such face by a suitable num-

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ber of wire clips 26, having their ends welded or otherwise fixed on the links of the chain (Figs. 3 and 4). It is preferred to engage said clips with alternate links of the chain, as per Fig. 3.

Mounted upon and beneath the casing 7 are a pair of similar "up" and "down" limit switches 27 and 28, the "up" switch being detailed in Fig. 6. Each such switch comprises a contact arm 29 downwardly sprung into normal engagement with a fixed contact 30. The hook-carrying vertical span of the chain 9 carries a laterally projecting control finger 31 which, at a desired upper limit of load travel engages and lifts the arm 29 of the "up" limit switch. Downward load travel is similarly limited by opening of the "down" switch by a control finger 32 (Fig. 2) fixed on and laterally projecting from the chain at a suitable distance from its anchored end.

Referring now to the electrical diagram (Fig. 11), it is first to be understood that same is illustrative of a control for a three phase motor 1, although other types of motors with suitably modified controls are applicable to my purpose. Lines 33, 33x and 33y lead from any three-phase power source into a reversing starter box 34 from which power lines 35, 35x and 35y lead through the connection box 25 to the motor. Within the starter box, switches 36 exercise a unitary control of current delivery to the motor for one direction of drive, and switches 37 similarly control current delivery for a reverse drive. The switches 36 are operable by a control coil 38 for effecting "up" travel of the load and a similar coil 39 operates the switches 37 for lowering the load. A relatively low amperage control circuit derives current from the lines 33 and 33x through a transformer 40. Said control circuit is formed by the conductors 24x and 24y connected in parallel, across leads from the secondary of the transformer 40, the conductor 24 forming one of said leads and the other being designated 41. The lead 24 is connected to the arm 17 of the main switch, and the conductors 24x and 24z lead respectively to the contacts 15 and 16. The conductor 24x includes the "up" limit switch 27 and control coil 38, and the conductor 24y includes the "down" limit switch 28 and control coil 39.

In use of the described hoist, when the push button 18 is free, the main switch arm 17 engages the contact 15 and, if the limit switch 27 is closed, the "up" control coil 38 is energized, closing the switches 36. Hence the load hook assumes its upper limiting position, determined by automatic opening of the switch 27. When the operator fully depresses the button 18, the arm 17 engages the contact 16, and if the limit switch 28 is closed, the "down" coil 39 is energized closing the switches 37, and effecting a lowering of the load hook. When the latter is in loading position, the operator maintains a neutral position of the arm 17 while applying a load to the hooks 13. He then releases the button, and the load is raised. Up travel may be terminated at any point through opening of the main switch, or the "up" limit switch may serve to establish some desired unloading position.

In the modification shown by Figs. 8, 9, and 10, a reversible motor 1a drives a drum 42 through a train of gears 43 occupying a casing 7a. Upon said drum winds a cable 44 within which is centrally extended a conductor cord 45 comprising three conductors (see Fig. 10). As in the first-described construction, said conductors lead to a suitable main switch 14a carried by the load-

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receiving hook 13a. The electrical connections may be substantially as per Fig. 11, except that it is necessary, as appears in Fig. 9, to provide collector rings 46 on an end of the drum, and to engage such rings by brushes 47 on a hanger 48 journaling an end of the drum shaft. The three conductors which extend from the drum-anchored end of the cable are respectively connected to the respective collector rings. While a brake or brakes will be necessary to the improved hoist in each of its disclosed forms, such brakes are common and no attempt has been made to show same.

Location of an electrical control station upon or in a permanently close proximity to the load receiver greatly facilitates operation of the hoist as compared to present practice, it being much easier to apply a load when the operator may keep one hand on the hook, using the other to shift the load. Thus the hook and load may be presented to each other in the most suitable loading relation. By extending the conductors leading to said control station along the chain or other load support, they are kept out of the way, avoiding interference either with the operator or the load, and are safeguarded from damage.

What I claim is:

1. In an electric hoist, an electric motor, a sprocket wheel, a speed-reducing drive from the motor to the sprocket wheel, a load-engaging element, a lifting chain carried on the sprocket wheel and supporting said element, a control switch carried by the chain in proximity to said element, and a control circuit for the motor including flexible conductors extending from the switch along the face of the chain which is outermost from the sprocket wheel, in passing over such wheel.

2. In an electric hoist as set forth in claim 1, a plurality of fasteners spaced longitudinally of the chain and straddling said conductors, the ends of such fasteners being secured to opposite sides of the chain.

3. In an electric hoist, an electric motor, a rotary lifting element, a speed-reducing drive from the motor to said element, a load-engaging element, an elongated flexible load-supporting connection from the lifting element to the load-engaging element actuatable up and down by the lifting element, a control switch carried by the flexible connection in proximity to the load-engaging element, a control circuit for the motor including flexible conductors carried by the flexible connection and extended along such connection from the switch to the rotary lifting element, a normally closed limit switch fixed with respect to travel of said connection and included in said control circuit, means carried by said connection for opening said limit switch, upon a predetermined lifting of the load, a second limit switch fixed with respect to travel of said elongated connection, and means carried by said connection for opening the last-mentioned switch upon a predetermined lowering of the load.

4. In an electric hoist, an electric motor, a rotary lifting element, a speed-reducing drive from the motor to said element, a load-engaging hook, an elongated flexible load-supporting connection from the lifting element to the hook, the hook being detachable from said connection, a control switch carried by the hook, a control circuit for the motor including flexible conductors carried by the flexible connection and extended along such connection from the switch to the rotary lifting element and passing over said ele-

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ment in unison with said connection, a readily releasable electrical connection from the switch to the conductors.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
681,941	Westbrook	Sept. 3, 1901

10

Number
1,413,094
1,473,606
1,960,371
1,978,753
2,335,563
2,432,411
2,433,938

6

Name	Date
Bergey	Apr. 18, 1922
Brandon	Nov. 13, 1923
Coffing	May 29, 1934
Lent	Oct. 30, 1934
Lock	Nov. 30, 1943
Guerin et al.	Dec. 9, 1947
Varner	Jan. 6, 1948

FOREIGN PATENTS

Country	Date
France	Oct. 9, 1928