March 17, 1925. 1,529,796

S. E. KALBACH

ELECTRIC HOIST

Filed April 30, 1924 4 Sheets-Sheet 1

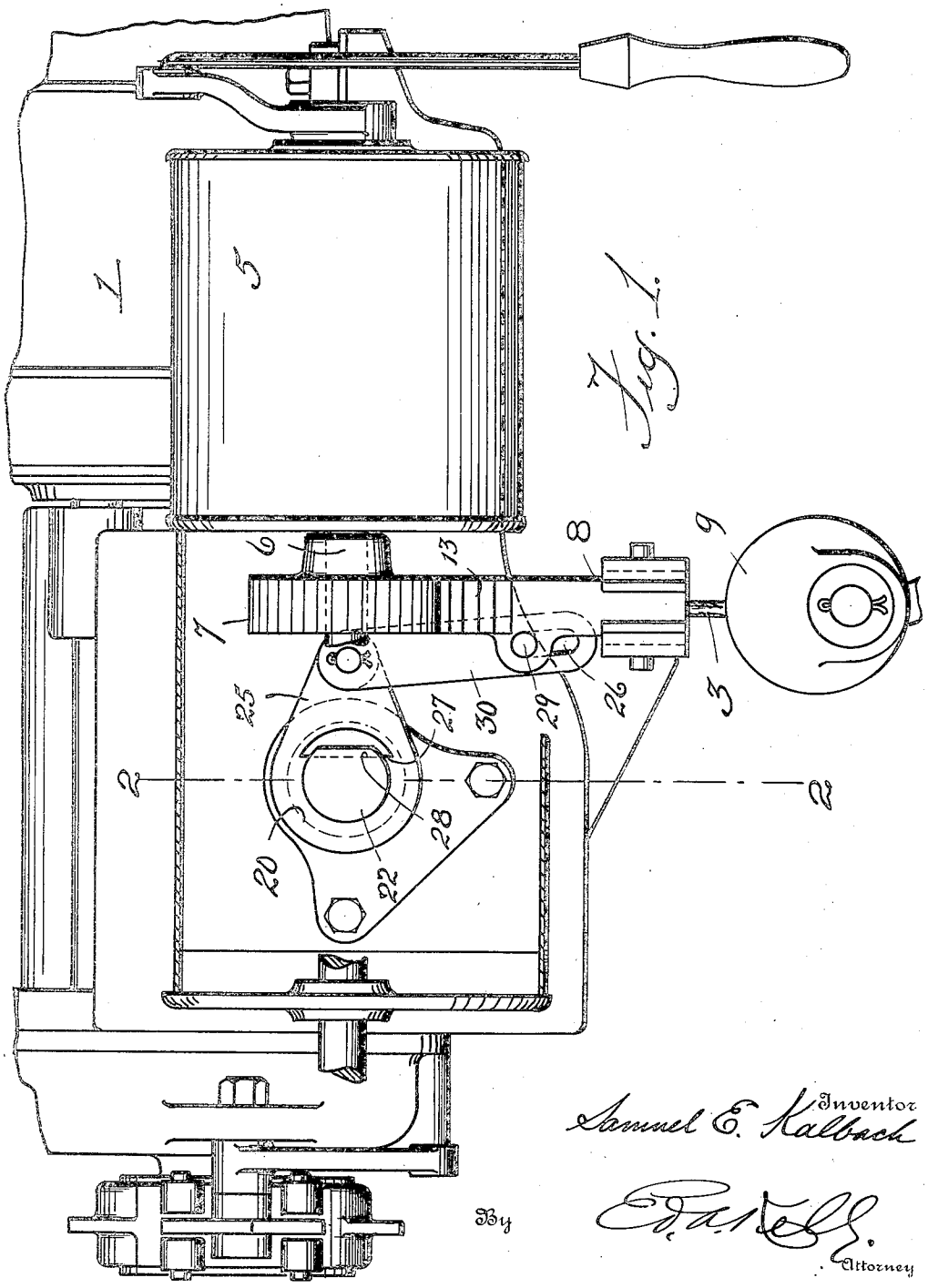

Fig. 1.

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Filed April 30, 1924 4 Sheets-Sheet 2

Fig. 3.

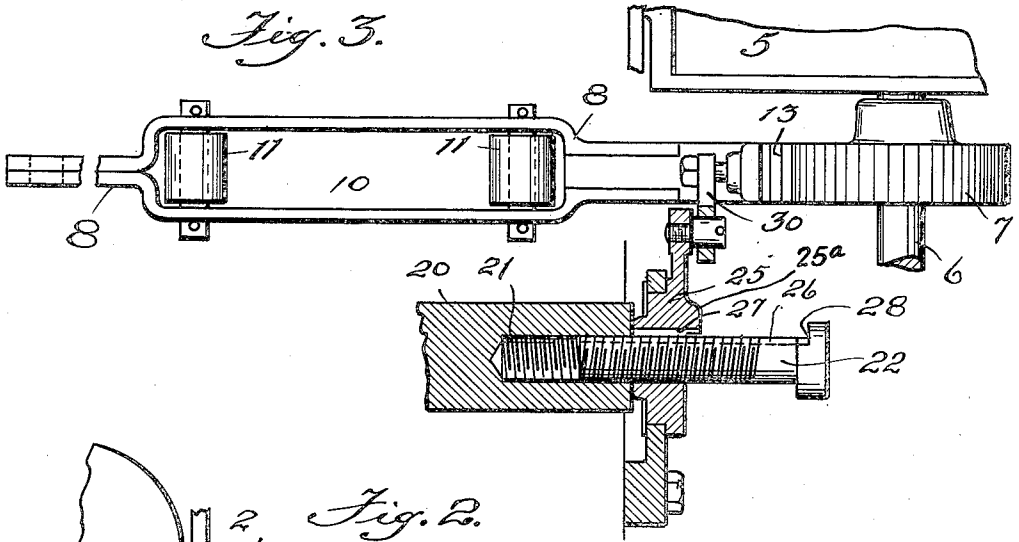
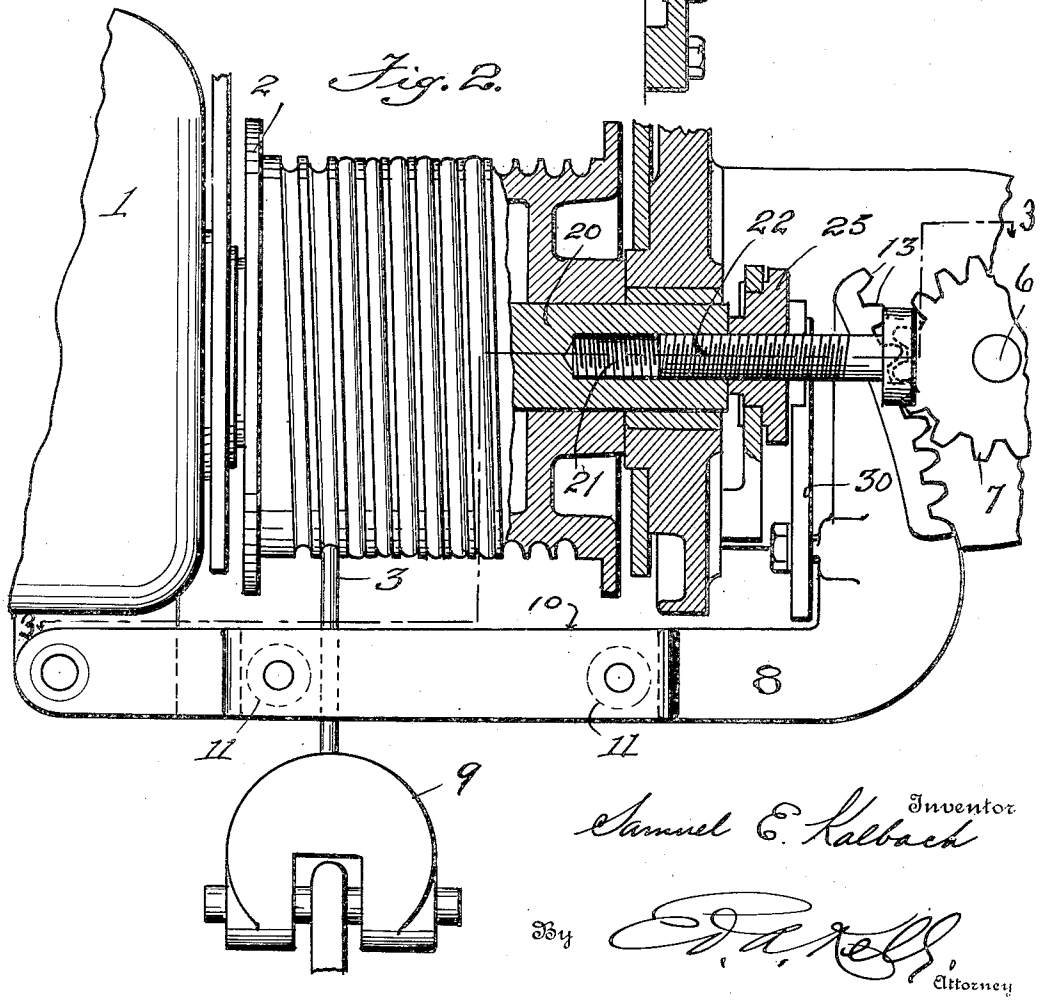


Fig. 2.



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Filed April 30, 1924 4 Sheets-Sheet 3

Fig. 5.

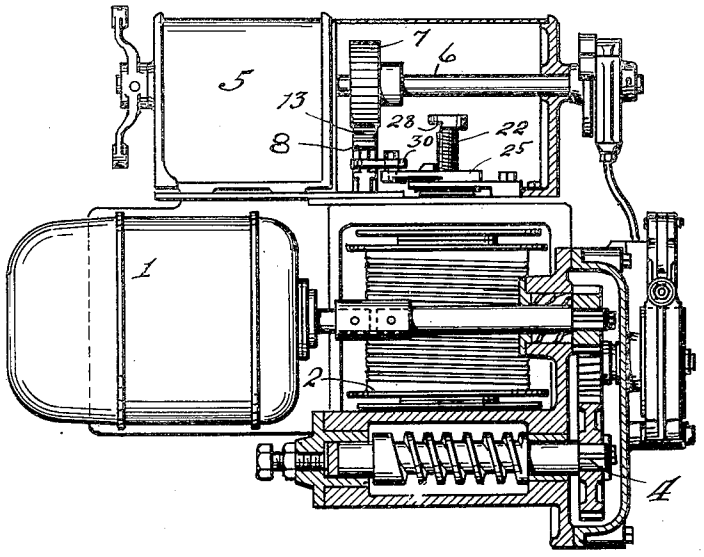
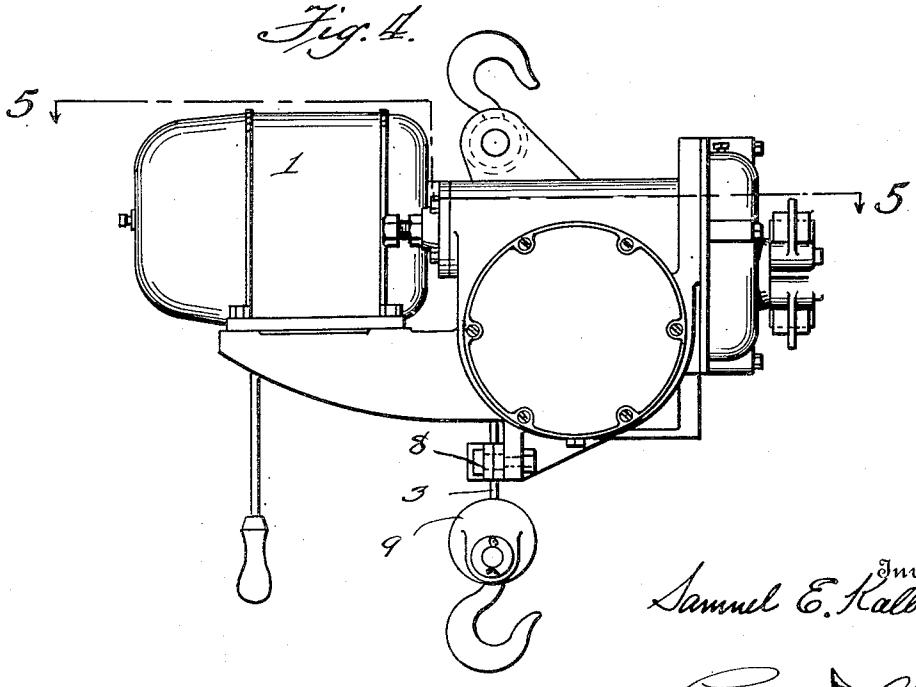


Fig. 4.



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ELECTRIC HOIST

Filed April 30, 1924 4 Sheets-Sheet 4

Fig. 7.

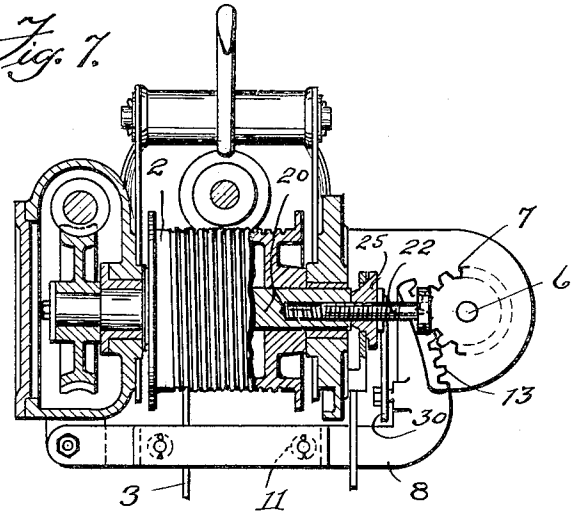
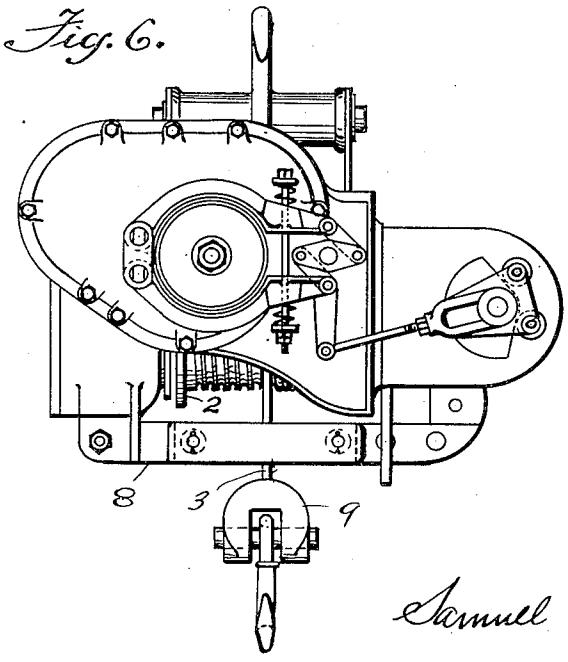


Fig. 6.



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Patented Mar. 17, 1925. 1,529,796

UNITED STATES PATENT OFFICE.

SAMUEL E. KALBACH, OF WYOMISSING, PENNSYLVANIA, ASSIGNOR TO HERMAN P. ROEPER, OF WYOMISSING, PENNSYLVANIA.

ELECTRIC HOIST.

Application filed April 30, 1924. Serial No. 709,971.

To all whom it may concern:

Be it known that I, SAMUEL E. KALBACH, a citizen of the United States, residing at Wyomissing, in the county of Berks and State of Pennsylvania, have invented certain new and useful Improvements in Electric Hoists, of which the following is a specification.

This invention relates to improvements in electric hoists and the object in the present invention is to provide a hoist of this character in which the different component units are arranged compactly, and in perfect balance, which will very materially facilitate the handling and operation of the hoist.

A further object is to provide a simple and effective means for stopping the action of the hoist at its predetermined low point of travel as well as the high point.

To this end I have provided an automatic stop of the trip lever type, which automatically provides for both top and bottom limits of travel for the hoist hook.

A further object is to provide means for adjusting the distance of hook travel.

A further object is to provide a suitable and effective rope guard for the hoisting cable, of the roller type.

A further object is to so arrange the different units that make up the device as a whole, that easy accessibility to any unit is assured, and, without the least interference with any other unit or parts thereof.

The invention is more fully described in the following specification and clearly illustrated in the accompanying drawings, in which:—

Figure 1 is a side elevational view of my hoist, showing the automatic limit stop for both upward and downward travel of the hook.

Figure 2 is a sectional view taken on line 2—2 of Figure 1, showing the limit stop from the brake end of the hoist.

Figure 3 is a partly sectional view taken through line 3—3 of Figure 2, showing the lower limit stop and the rope guard.

Figure 4 is a side elevational view, showing the side opposite that shown in Figure 1.

Figure 5 is a sectional view taken through the line 5—5 of Figure 4.

Figure 6 is an end elevational view, showing the brake end of the hoist.

Figure 7 is a reduced sectional view, similar to Figure 2 but showing the drive mechanism.

The numeral 1 designates the motor; 2 the hoisting drum; 3 the hoisting cable; 4 the drum driving mechanism; 5 the controller; 6 the controller shaft; 7 the controller pinion; 8 the trip lever and 9 the cable block.

The trip lever is formed with a slotted portion 10 in which is located a pair of rollers 11 against which the cable may bear in its travel through this slotted lever. The lever is pivoted at one end to the under side of the driving gear housing, and its free end is formed with a rack having teeth, 13, adapted to mesh with the pinion 7 on the controller shaft 6.

This trip lever, which serves also as a guide for the hoisting cable, insures the positive actuation of the controller when the cable hook reaches its upper limit, for the reason that the cable passed through the slot in the lever and the block will positively contact with the lever when its reaches the high point. This contact of the block with the pivoted lever, will cause it to rise, and, through the engagement of its toothed rack with the pinion of the controller shaft, will actuate the controller and shut of the power.

The numeral 20 designates the drum shaft, which rotates with the drum, and this shaft is formed with a central, treaded opening 21 in which is fitted the bottom stop adjusting screw 22. This screw passes through and is secured in a lever 25 by a key 26. The lever is formed with a depression 27 thus providing a lug 25^a and the screw has a squared portion 28 adapted to engage the said lug, so that, when the drum shaft rotates, the screw will move into and out of the threaded opening in the shaft, but will not rotate until said squared portion 28 has contacted with the lug 25^a, when the lever will rotate with the drum shaft. This lever is provided with a link 30, pivoted thereto, and its opposite end is attached to the trip lever 8, so that, when the screw has entered the drum shaft the predetermined distance, which distance may be regulated to suit the downward travel distance of the block, this engagement of the head of the screw with the trip lever, through the link connection, will cause the lever 8 to move

downwardly, as to its toothed rack end, and rotate the pinion on the controller shaft and shut off the power. This movement of the lever being in the opposite direction from that caused by the upward movement of the cable block. It is evident that, when the lever 8 is moved in either direction this movement will bring the controller to neutral position.

It will be noted therefore, that, when the screw 22 has been regulated so that it actuates the stop device at the point when the load reaches its predetermined low position, the same mechanism for actuating the controller is put into operation that is operated by the block when it attains its high limit of travel.

The link 30 is formed with an elongated slot 26 at its lower extremity, where it is attached to the lever 8, and a pin 29 on the lever 8 travels in the slot, so that when the link moves in the opposite direction the lever 8 will not move and the controller will not be affected thereby.

The main frame of the hoist is a single piece casting, which is properly machined to receive the component parts, which, it will be noted, are so arranged that a perfect balance is at all times maintained, while the complete assembly of the units results in a compact arrangement.

The motor, the controller, the drive mechanism and the other units are such as are used on other hoists, and no claim is made as to the construction of such units.

The invention in the present instance resides in the construction whereby the top as well as the bottom limit of the block (the load) may be predetermined and the movement of the hoisting mechanism automatically stopped when such top or bottom limit has been attained.

The top limit is reached when the block in its upward travel contacts with the trip lever 8, while the bottom limit is determined by the distance of travel of the screw 22 into the drum shaft, which distance may be regulated at will, so that, when the downward limit has been reached the squared head of said screw will be in engagement with the stop mechanism above described, and which in turn actuates the trip lever 8.

I claim and desire to secure by Letters Patent:—

1. In an electric hoist, a motor, a controller, a hoisting drum, a cable therefor, a pinion on the controller, a lever pivotally mounted on the hoist and having a toothed rack engaging said pinion, a screw in the drum, a lever mounted for engagement by the head of said screw, a link carried by said lever and connected with said pivoted lever, whereby when the head of the screw engages the lever the controller will be actuated.

2. A hoist comprising a motor, a winding drum, a shaft therefor, a screw in said shaft said screw having a squared head portion, a lever mounted for engagement by said screw head, a link carried by said lever and connected to it pivotally, a trip lever to which said link is connected, a toothed rack on said trip lever, a controller, a pinion on the controller in engagement with said toothed rack, whereby when the drum shaft rotates, the screw moves into said shaft and actuates the trip lever, through the medium of the lever and link, to stop the motor.

3. In a hoist of the character described, the combination of a controller, a trip lever having a toothed rack in mesh with the controller pinion, said trip lever being directly actuated by the hoist block at its top limit, with a winding drum, a headed screw movable therein, a lever mounted for engagement by the head of the screw, and a link connecting said lever with the trip lever, whereby the engagement of the headed screw with the lever will actuate the controller to stop the motor.

In testimony whereof I affix my signature.

SAMUEL E. KALBACH.