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CONTROL MECHANISM FOR ELECTRICALLY DRIVEN APPARATUS

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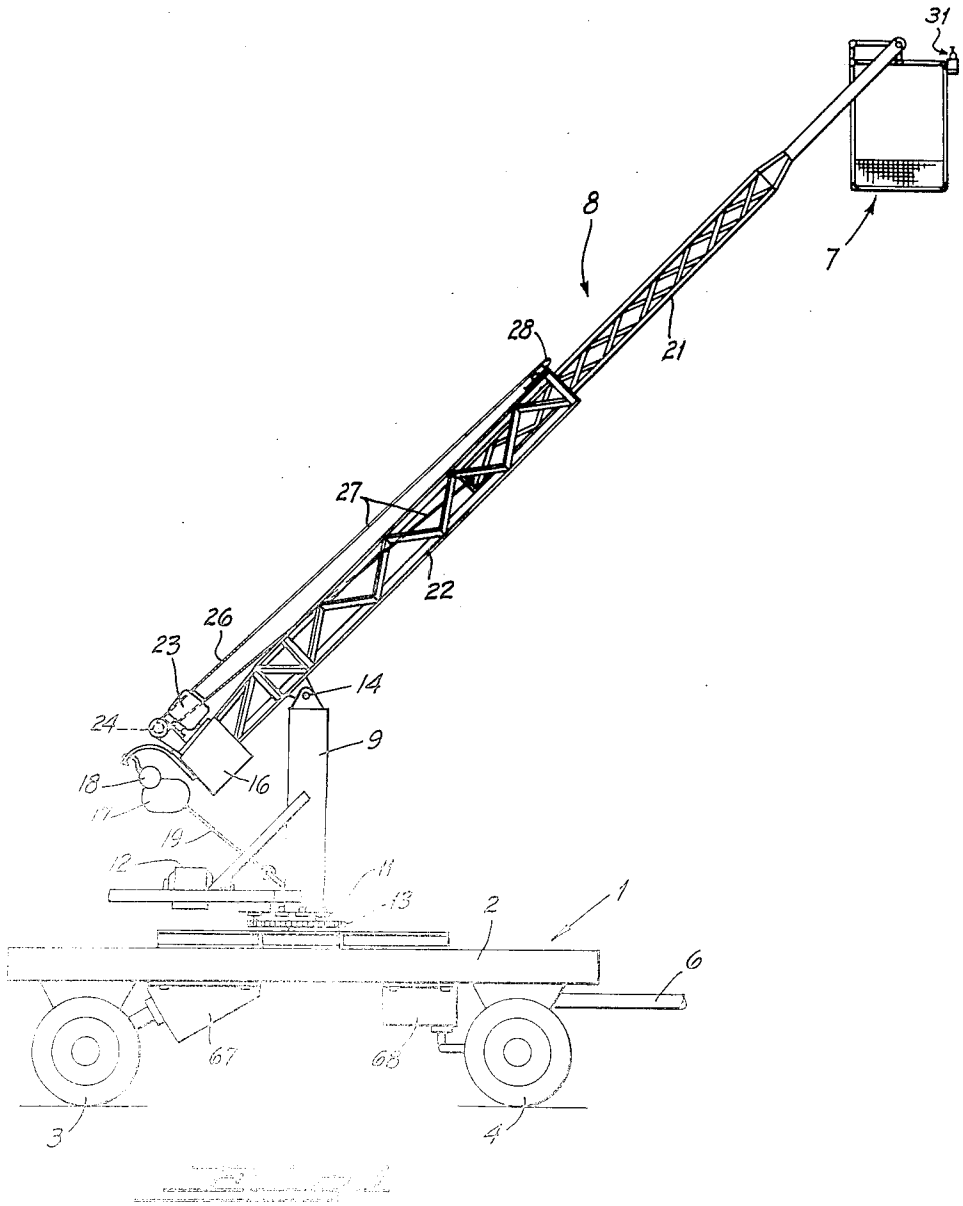


FIG. 1

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CONTROL MECHANISM FOR ELECTRICALLY DRIVEN APPARATUS

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7 Claims. (Cl. 200—5)

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My invention relates to an improved mechanism for manually controlling electrically driven apparatus, and also relates to such control mechanism in conjunction with workman's lift apparatus such as disclosed in my copending application Serial No. 71,349, filed January 17, 1949, now abandoned.

It is among the objects of my invention to provide a simple control mechanism for selectively actuating a plurality of switches by a single operating lever.

Another object is to provide a mechanism of the character described in which the motions of the operating lever may be related to the motions of the apparatus being controlled.

A further object is to provide a workman's lift apparatus having a work station mounted for universal movement to any desired elevated position, and incorporating improved mechanism so that the workman can control his position without leaving the work station.

A still further object is to provide such a control mechanism having an operating lever with universal motions corresponding to the universal motions of the work station of the lift apparatus being controlled.

The invention possesses other objects and feature of advantage, some of which, with the foregoing, will be set forth in the following description of my invention. It is to be understood that I do not limit myself to this disclosure of species of my invention as I may adopt variant embodiments thereof within the scope of the claims.

Referring to the drawings:

Figure 1 is a side elevational view of lift apparatus embodying the improvements of my invention.

Figure 2 is a side view of the improved control mechanism; and

Figure 3 is a vertical sectional view of the same.

Figure 4 is a detail sectional view taken in the plane indicated by line 4—4 of Figure 3; and

Figure 5 is a horizontal sectional view taken in the plane indicated by line 5—5 of Figure 3.

In terms of broad inclusion, my electric control mechanism comprises an operating lever pivotally mounted at one end for universal tilting movement, a plurality of switches disposed about the lever, and means on the lever for selectively actuating one or more of the switches upon tilting of the lever. The operating lever is also preferably axially extensible with means provided for actuating additional switches upon axial movement of the lever. The several switches of the

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mechanism are connected with devices such as motors of the electrically driven apparatus to be controlled. Thus, in a workman's lift apparatus having a work station on the end of an extensible boom rotatably mounted for turning movement about a vertical axis and swinging movement about a horizontal axis, the improved control mechanism is located at the work station and the switches are connected to the boom drive motors so that sidewise tilting motions of the operating lever turn the boom clockwise or counterclockwise, vertical motions of the lever swing the boom up or down, and forward or back tilting motions of the lever extend or retract the boom, all motions of the operating lever being therefore related to the motions of the work station on the boom.

In greater detail, and referring to the drawings, Figure 1 shows a workman's lift apparatus embodying by improved control mechanism, which type of lift apparatus is disposed in my hereinbefore mentioned earlier application. In my earlier application the several drive motors of the apparatus are controlled by separate switches at the work station. That arrangement is entirely practical but it is somewhat difficult for a workman to learn to operate the apparatus because the manipulation of the separate switches is not directly related to the motions of the work station. This problem is overcome with my present improvements.

The lift apparatus comprises a vehicular mount 1 having a bed 2 and wheels 3 and 4. This vehicle may be a trailer having a tongue 6 for distance traveling, although separate means are also preferably provided for driving and steering the mount about a local area. A work station 7 is carried on the outer end of a boom 8 which projects from the mount 1, the work station being preferably a cage pivotally suspended from the boom.

Boom 8 is rotatably supported on the mount for turning about a vertical axis, as by a hollow column 9 journalled by rollers 11 about a post projecting from the bed of the mount. The boom is turned about the vertical axis by a reversible motor 12 drivably connected to column 9 by suitable gearing 13. Boom 8 may thus be turned either clockwise or counterclockwise depending upon the direction of rotation of motor 12.

The boom is also rotatably supported for swinging movement about a horizontal axis, as by a pivot pin 14 on the top of column 9. A suitable

acter disclosed, means are also preferably provided for driving and steering the vehicular mount 1, which means is controllable at the elevated work station 7 so that the workman can shift the position of the mount about a local area. A motor driven transmission 67 is arranged to drive the rear wheels, and a motor driven steering mechanism 68 is provided for guiding the front wheels. The control device for the reversible motors of the drive and steering mechanisms is preferably similar to that above described for the boom. For example, the switches 48 and 49 may be employed for driving the vehicle forwardly or in reverse, while the switches 53 and 54 may be employed for turning the vehicle to the right or to the left. In this case the vertical switches would not be required and the control mechanism would therefore be of more simplified construction.

While my control mechanism is particularly well adapted and highly useful in the control of the lift apparatus herein described, it is understood that the improved mechanism may be used for controlling a wide variety of electrically driven apparatus.

I claim:

1. An electric control mechanism comprising a frame, an operating lever projecting vertically from the frame, a universal joint connecting the lower end of the lever to the frame, a plurality of push button switches disposed horizontally about the lever, an actuating plate mounted transversely on the lever adjacent the switches for selectively engaging one or more of the push buttons upon tilting of the operating lever, said lever having an axially slidable section, a push button switch carried by the lever, and an actuating finger on the movable section for engaging the push button of the last mentioned switch upon axial movement of said section.

2. An electric control mechanism comprising a frame, an operating lever projecting vertically from the frame, a universal joint connecting the lower end of the lever to the frame, a plurality of push button switches disposed horizontally about the lever, an actuating plate mounted transversely on the lever adjacent the switches for selectively engaging one or more of the push buttons upon tilting of the operating lever, said lever having an axially slidable section, a pair of push button switches carried by and spaced vertically on the lever, and an actuating finger on the movable section for engaging the push button of one or the other of the last mentioned switches upon axial movement of said section.

3. An electric control mechanism comprising a frame, an operating lever projecting vertically from the frame, a universal joint connecting the lower end of the lever to the frame, a plurality of push button switches disposed horizontally about the lever, an actuating plate mounted transversely on the lever adjacent the switches for selectively engaging one or more of the push buttons upon tilting of the operating lever, said lever having an axially slidable section, a pair of push button switches carried by and spaced vertically on the lever, an actuating finger on the movable section for engaging the push button of one or the other of the last mentioned switches upon axial movement of said section, and resilient means for normally maintaining said lever in vertical position and for normally holding said slidable section against axial movement.

4. An electric control mechanism comprising

a frame, an operating lever projecting vertically from the frame, a universal joint connecting the lower end of the lever to the frame, a plurality of push button switches disposed horizontally about the lever, an actuating plate mounted transversely on the lever adjacent the switches for selectively engaging one or more of the push buttons upon tilting of the operating lever, said lever having an axially slidable section, a pair of push button switches carried by and spaced vertically on the lever, an actuating finger on the movable section for engaging the push button of one or the other of the last mentioned switches upon axial movement of said section, and resilient means for normally maintaining said lever in vertical position and for normally holding said slidable section against axial movement, said last mentioned means comprising a spiral spring encircling the lever with its smaller end fastened to the slidable section and its larger end fastened to said frame.

5. An electric control mechanism comprising a frame, an operating lever projecting vertically from the frame, a universal joint having two crosswise pivot axes connecting the lower end of the lever to the frame, a pair of push button switches disposed on opposite sides of the lever across one pivot axis, another pair of push button switches disposed on opposite sides of the lever across the other pivot axis, and an actuating plate mounted transversely on the lever adjacent the switches, whereby said plate is selectively engageable with one or the other of the push buttons of either pair of said switches upon tilting of the operating lever about one or the other of its pivot axes, and whereby said plate is simultaneously engageable with the push buttons of two adjacent switches of either pair upon tilting of the operating lever simultaneously about both of its axes.

6. An electric control mechanism comprising a frame, an operating lever projecting vertically from the frame, a universal joint having two crosswise pivot axes connecting the lower end of the lever to the frame, a pair of push button switches disposed on opposite sides of the lever across one pivot axis, another pair of push button switches disposed on opposite sides of the lever across the other pivot axis, an actuating plate mounted transversely on the lever adjacent the switches, whereby said plate is selectively engageable with one or the other of the push buttons of either pair of said switches upon tilting of the operating lever about one or the other of its pivot axes, and whereby said plate is simultaneously engageable with the push buttons of two adjacent switches of either pair upon tilting of the operating lever simultaneously about both of its axes, and resilient means for normally maintaining said lever in vertical position.

7. An electric control mechanism comprising a frame, an operating lever projecting vertically from the frame, said operating lever comprising two telescoping sections, a universal joint connecting the lower end of the lower section of the lever to the frame, a plurality of switches disposed in a horizontal series about the lever, an actuating plate carried by and centered upon the lever adjacent the switches for selectively engaging one or more of the switches upon tilting of the operating lever, a pair of switches carried by and spaced vertically upon the lower section of the telescoping lever, and an actuating finger on the relatively movable telescoping upper section of

the lever for engaging one or the other of said last mentioned switches upon axial telescoping movement of the sections of the lever.

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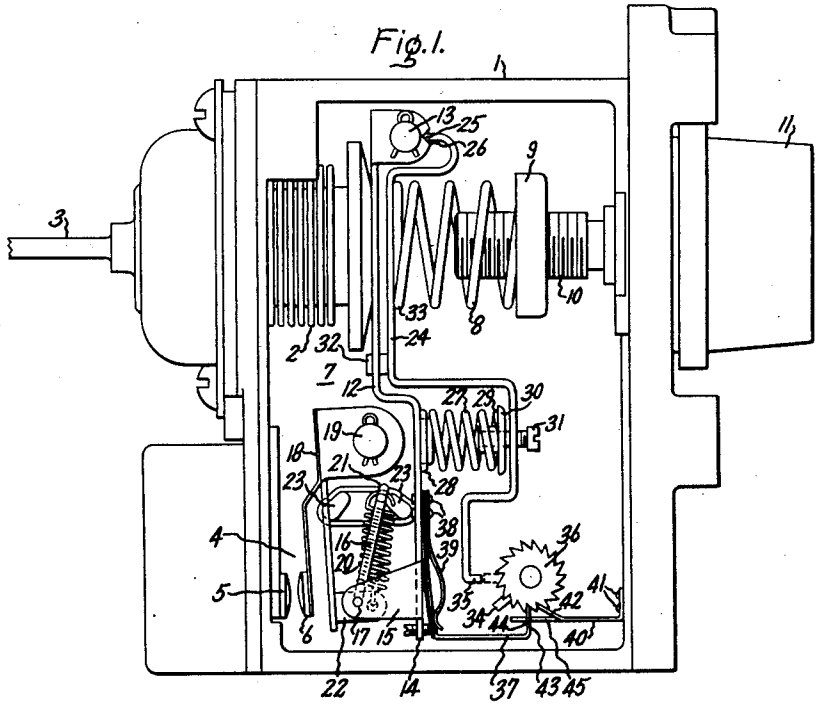
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REFRIGERATOR CONTROL

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Fig. 1.



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