April 15, 1930. G. R. BLACKWOOD 1,754,873

HOISTING MECHANISM

Filed June 15, 1928

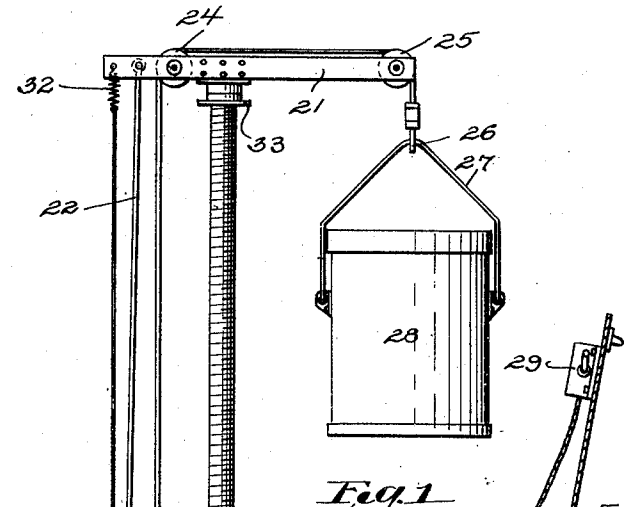


Fig. 1

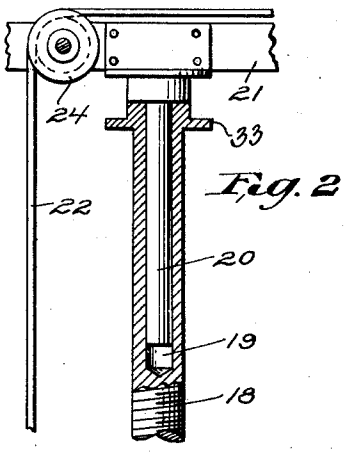


Fig. 2

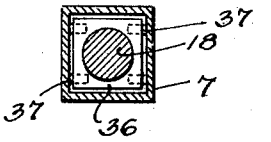


Fig. 4

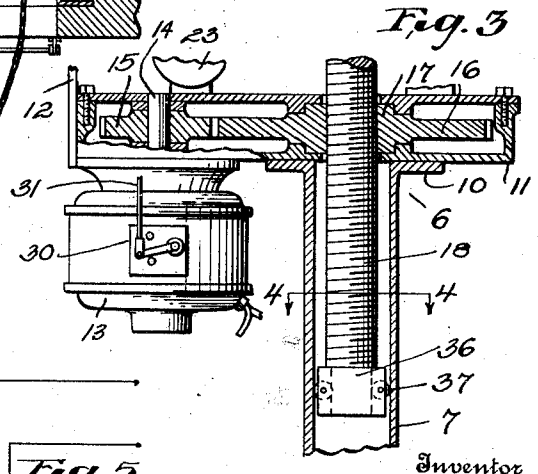


Fig. 3

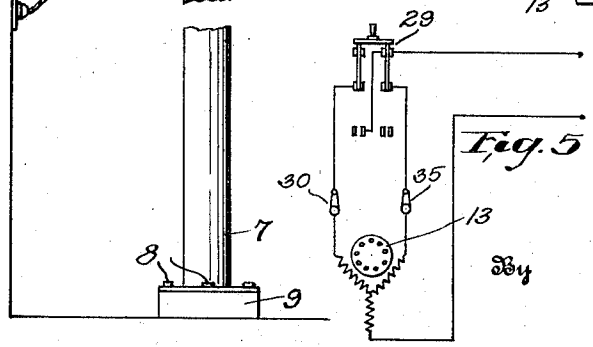


Fig. 5

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UNITED STATES PATENT OFFICE

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HOISTING MECHANISM

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This invention relates to hoisting apparatus such as is used in sidewalk hoistways and the like for raising ash cans and other loads from a cellar to sidewalk levels.

The present invention has for its objects, among others, to provide a simple yet durable and efficient hoisting mechanism applicable to various types of hoistways and movable therein to assume collapsed or extended positions.

It is another object of the invention to provide a hoisting mechanism which is operated by means of an electrical motor, whereby a shaft may be raised or lowered in a hoistway to effect the raising and lowering of an associated receptacle, and wherein provision is made for arresting automatically the operation of the driving motor when such shaft approaches the extremities of its collapsed and extended positions of movement.

It is another object of the invention to connect the refuse receiving receptacle with the extensible shaft so that as said shaft raises and lowers the refuse receptacle will be moved in unison therewith but preferably at an accelerated rate of travel.

With these and other objects in view which will appear as the description proceeds, the invention consists in the novel features of construction, combinations of elements and arrangements of parts hereinafter to be fully described and pointed out in the appended claims.

In the accompanying drawings:

Figure 1 is a vertical sectional view taken through a hoistway illustrating the hoisting apparatus comprising the present invention situated therein,

Figure 2 is a vertical sectional view showing the swivel connection between the hoisting boom and the screw shaft,

Figure 3 is a detail sectional view taken through the head of the supporting casing and disclosing more particularly the driving mechanism for this screw shaft,

Figure 4 is a horizontal sectional view on the line 4—4 of Figure 3,

Figure 5 is a diagrammatic view of the electrical circuits used for control of operation of the driving motor.

Referring more particularly to the drawings the numeral 1 designates a hoistway of the type commonly found in connection with street sidewalks for the purpose of removing ashes and other refuse from a cellar, permitting such refuse to be elevated to a position above the street or sidewalk level so that it may be discharged into a truck or other carrier and conveniently removed. The numeral 2 designates the sidewalk in which is provided an opening 3 forming a part of the hoistway. Surrounding the opening 3 is a frame 4 of structural metal, and carried by the frame is a hinged door 5 which may be moved to assume open or closed positions in the usual manner common to sidewalk doors of this character.

Adapted to be positioned within the hoistway is a hoisting mechanism 6. This mechanism comprises a casing 7 which has its lower end suitably secured as at 8 to a concrete base 9. The casing may be of any suitable height but preferably terminates immediately adjacent to the under side of the sidewalk 2 in a flange 10 which supports an enlarged housing 11. The housing is also connected at one side by means of a strap 12 with the frame 4.

Connected with the housing and suspended from one end thereof is a reversible electrical motor 13, the armature shaft 14 of which is provided with a pinion 15 arranged horizontally for rotation within the housing 11. The pinion 15 meshes with a gear 16 which is provided with a threaded hub 17 adapted for the reception of a vertically extending screw shaft 18, the latter being adapted to be telescoped within the casing 7 when not in use and to be projected to a considerable distance above the height of the sidewalk when in active use. It will be seen that upon the rotation of the motor armature 13 rotary movement will be imparted to the gear 16, since the latter is rotatably confined within the stationary housing 11 vertical motion is imparted to the shaft 18.

The upper end of the shaft 18 includes a socket 19 in which is recived a king pin 20 which is carried by a dependent on the intermediate portion of a hoisting boom 21. The

king pin 20 permits the boom to turn horizontally about the vertical axis of the shaft 18. Fixed to one end of the boom is a cable 22 which extends downwardly and is passed over a pulley 23 mounted on the housing 11. From the pulley 23 the cable extends upwardly and is turned around a pulley 24 on the boom 21 and is thence directed horizontally and passed around a second pulley 25 carried by the outer end of the boom 21. The cable extends downwardly and is provided with an eye or hook 26 adapted for the reception of a bail 27 carried by a suspended ash or refuse receptacle 28. It will be seen that by this arrangement of pulleys the receptacle 28 will be raised or lowered at substantially twice the speed of vertical travel of the screw shaft 18.

To govern the operation of the motor 13 there is mounted on the under side of the door 5 a control switch 29 which in this instance has been indicated as being of the knife variety. It will be seen that when the door is open the switch 29 will be conveniently accessible whereupon the operator may close the switch so as to energize the motor 13. This permits the screw shaft to raise vertically, lift the boom 21 from a horizontal position below the door 5 to an elevated position well above the sidewalk level, as indicated in Figure 1. To provide for the automatic stopping of the motor in the event the switch 29 is not operated through any cause by the attendant, there is provided upon the casing of the motor 13 a small oscillating type of switch 30. The operating arm of this switch is connected by means of a cable or rod 31 with a spring 32 suspended from one end of the boom 21. Thus when the boom reaches approximately its extreme upper position of elevation the cable or rod 31 is rendered taut and some tension applied to the spring 32, which results in the actuation of the switch 30 so as to open the motor circuit and to thereby arrest further upward movement of the screw shaft automatically. Similarly, when the boom descends to its lowermost position a flange 33 on the upper end of the screw shaft contacts with a pivoted switch arm 34 carried by a switch 35 which is mounted on the housing 11. The switch 35 also operates under these conditions to open the motor circuit and to thereby prevent possible damage to the operating mechanism of the hoist by failure on the part of the operator to actuate the switch 29 at the proper time.

The lower end of the screw shaft may be provided with a head 36 which is receivable within the substantially square casing 7, as indicated in Figure 4. The head 36 prevents rotation on the part of the screw shaft and thereby permits of the raising and lowering of the latter in response to the forced rotation of the gear 16. The head 36 may be equipped with anti-friction rollers 37 to facilitate the rise and fall of the shaft within the casing. A lead 38 may be extended from a wall socket or other source of energy to the motor 13 and likewise leads 39 may be extended from said motor to the door switch 29.

The supplemental switch 35 is also operated to automatically open the motor circuit by a bar 40 pivotally connected with the switch arm 34 in the event the bucket comes into contact accidentally with the sides of the cellarway opening, thus preventing injury to the operating mechanism through the automatic control.

What is claimed is:

1. In combination with motor driven hoisting apparatus for lifting a bucket through an opening, a switch arranged for controlling the operation of said motor and a member pivotally carried by the lower edge of said opening and cooperative with said switch and so arranged that upon the failure of said bucket when raised to register with said opening the switch will be opened and the upward movement of the bucket stopped.

2. In combination with motor driven hoisting apparatus for lifting a receptacle through an opening, a switch arranged for controlling the operation of said motor and a bar positioned at the side of said opening and pivotally connected with said switch and so arranged that upon the failure of said receptacle when lifted to register with said opening, said switch will be operated and the upward movement of the receptacle arrested.

3. In combination with motor driven hoisting apparatus for lifting a receptacle through an opening, a switch arranged for controlling the operation of said motor and a bar pivotally carried near the lower edge of said opening and cooperative with said switch and so arranged that upon the failure of said receptacle when raised to register with said opening the switch will be operated and the upward movement of the receptacle arrested.

In testimony whereof I affix my signature.

GUY R. BLACKWOOD.