Oct. 15, 1929. W. HEGARTY ET AL 1,731,897

HANDLING DEVICE FOR FOUNDRY LADLES OR THE LIKE

Filed April 12, 1928

Fig.1.

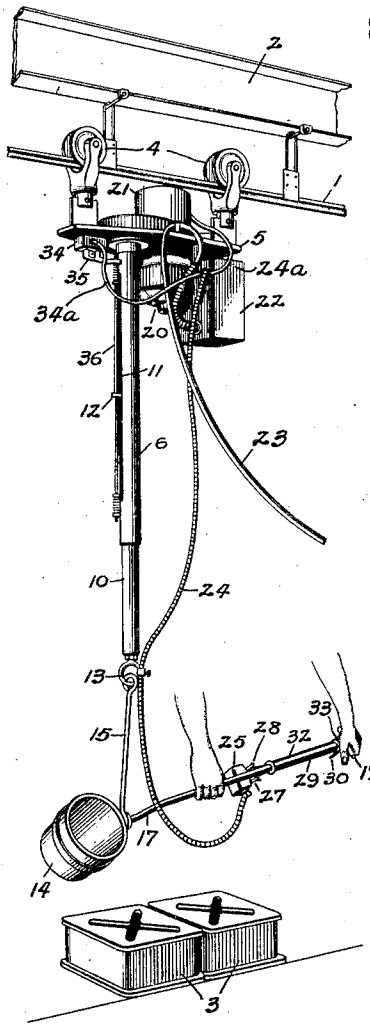
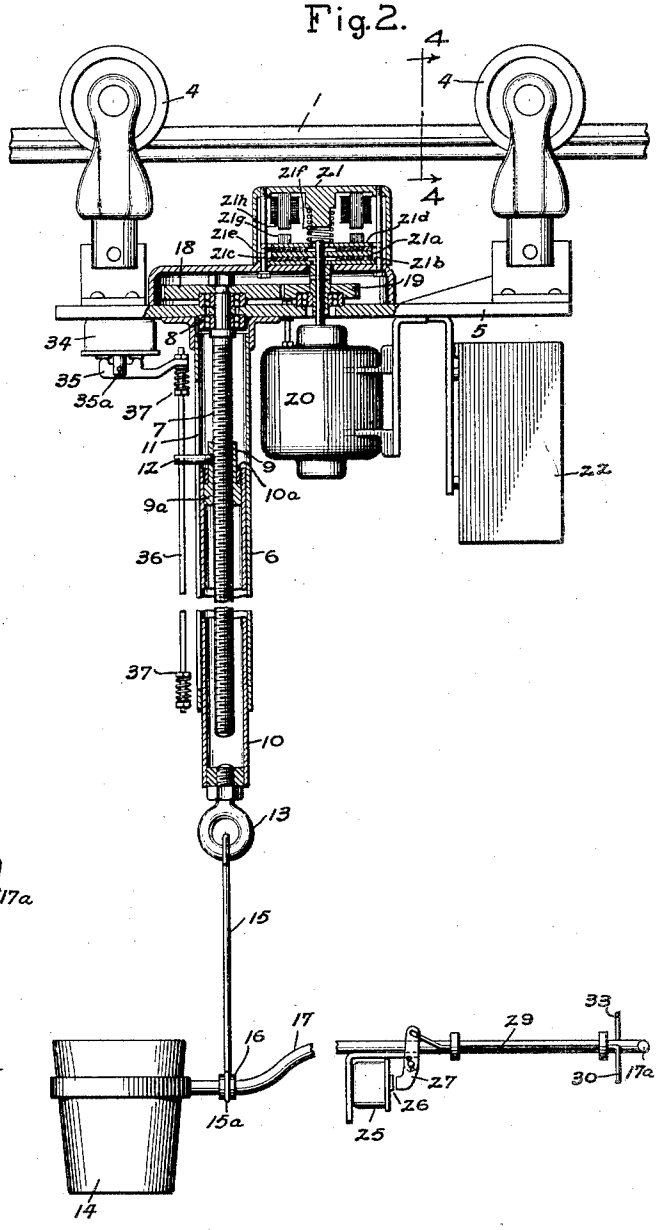


Fig.2.



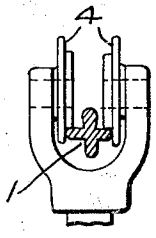
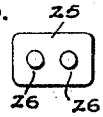


Fig.4.

Fig.3.



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UNITED STATES PATENT OFFICE

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HANDLING DEVICE FOR FOUNDRY LADLES OR THE LIKE

Application filed April 12, 1923. Serial No. 269,529.

In foundries where comparatively large numbers of relatively small castings are made, it is the practice to prepare a row of molds after which the molten metal is poured into them. For this purpose the ladle is supported from an overhead track and the operative pours the molten metal into the molds one after another, the ladle and suspension means being moved along the track and the ladle being tipped by hand.

In carrying out the pouring operation it is desirable to be able to raise and lower the ladle for different molds or different pouring conditions and, in some instances, it may be desirable to raise or lower the ladle while pouring.

The primary object of our invention is to provide an improved construction and arrangement for supporting a foundry ladle or the like whereby the ladle or the like can be raised and lowered at will, either during the pouring operation or between pouring operations, and to provide an improved control arrangement whereby the raising and lowering mechanism is always under immediate and convenient control of the operative.

A further object of our invention is to provide an improved mechanism of the type referred to which is simple and compact in structure and wherein the major portion of the mechanism is carried by an overhead platform so as to be out of the way of the operative.

For a consideration of what we believe to be novel and our invention, attention is directed to the accompanying description and the claims appended thereto.

In the drawing Fig. 1 is a perspective view of a ladle handling device embodying our invention;

Fig. 2 is a view of the mechanism partly in section and on a larger scale;

Fig. 3 is a detail view of a double contact switch which forms a part of the control mechanism, and

Fig. 4 is a detail sectional view taken on line 4—4 of Fig. 2.

Referring to the drawing, 1 indicates an overhead rail or track suitably supported from a beam 2, the rail extending along the foundry in suitable relation to the positions which the molds to be poured occupy. 3 indicates several molds to be poured. It will be understood that in actual practice there may be a long row of such molds and also that they may not be all alike, some being higher than others, for example.

Supported on track 1 by means of rollers 4, so that it can be moved along the track is a platform 5 which supports and carries the operating mechanism for the ladle.

Depending from the underside of platform 5 and rigidly fixed thereto is a tubular casing 6 which houses certain of the moving parts. Inside casing 6 is a threaded rod 7 mounted in suitable bearings 8 in platform 5 so that it may turn easily therein. In the present instance bearings 8 are shown as being ball bearings suitably arranged to support the rod and to serve as a combined radial and thrust bearing for the rod.

On the threaded rod 7 is a traveling nut 9 having a collar 9^a on which is hung a vertical sleeve 10, the upper end of sleeve 10 being provided with an inwardly projecting collar 10^a which engages the collar 9^a. This provides a swivel connection between the nut 9 and sleeve 10. Sleeve 10 projects below and is adapted to slide vertically in casing 6, when nut 9 is forced to move up and down along rod 7. In the side wall of casing 6 is a vertically extending slot 11 through which projects a pin 12 connected to nut 9. Pin 12 engages the side edges of slot 11 and serves to hold nut 9 from turning on or with rod 7, so that when rod 7 turns the nut is forced to move or travel vertically along the rod. Fastened in the end of the sleeve 10 is an eye 13 from which the ladle 14 is suspended by means of a rod 15. The rod 15 has a hook 15^a at its lower end in which rests a grooved spool 16 fixed on ladle handle 17. Spool 16 fits snugly in hook 15^a, the arrangement being such that while it permits turning of the ladle in the hook to pour, it prevents accidental tipping of the ladle, should the operative stumble or fall. At the end of ladle handle 17 is a cross-bar 17^a which forms a grip for the hand of the operative.

Connected to the upper end of threaded

rod 7 is a gear-wheel 18 which meshes with a pinion 19 on the end of the shaft of a motor 20. Motor 20 is suitably mechanically connected to and suspended from the under side of platform 5.

Connected to the motor shaft is a magnetic disc brake 21 of suitable type wherein when the current is "on", the brake is released while, when the current is "off" the brake is applied. The purpose of this brake is to quickly stop the motor whenever the current is shut off. In the present instance the brake is shown as comprising a friction disc 21^a fixed on the motor shaft, a stationary plate 21^b having a facing of friction material 21^c and a vertically movable plate 21^d having a facing of friction material 21^e. The friction disc 21^a is normally held between the friction facings by means of a spring 21^f. Connected to plate 21^d is an armature 21^g and arranged in operative relation thereto is a suitable electromagnet 21^h. When the electromagnet is energized plate 21^d is lifted to release disk 21^a. The electromagnet is suitably connected in the circuit by the motor so that whenever the motor is energized the electromagnet operates to release the brake. As soon as the circuit for the motor is opened spring 21^f functions to apply the brake and stop quickly the movement of the motor armature.

22 indicates a suitable control panel for motor 20. The control panel is connected to a source of electrical energy by means of a cable 23. It is connected by a cable 24 to a double contact control switch 25 fastened on ladle handle 17, and by a cable 24^a to disk brake 21. Motor 20 is a suitable type reversing motor capable of operation in either direction. When operated in one direction it turns rod 7 in a direction to lift nut 9, and hence lift the ladle, while when operated in the other direction, it turns rod 7 in a direction to lower nut 9, and hence lower the ladle. Switch 25 has two contact buttons 26 and 26^a adapted to be operated by pivoted levers 27 and 28 respectively. Contact button 26 when pushed inward serves to close a motor circuit to effect operation of motor 20 in one direction, and contact 26^a when pushed inward serves to close a motor circuit to effect operation of the motor 20 in the other direction. A wiring diagram of the connections is not shown in the drawing, as they are of simple character and of obvious arrangement.

Connected to lever 27 is an operating rod 29 having a handle 30 which terminates adjacent to handle grip 17^a and connected to lever 28 is an operating rod 32 having a handle 33 located opposite to handle 30. Handles 30 and 33 are within immediate reach of the hand of the operative when his hand is holding grip 17^a. With this arrangement the operative, while holding the grip 17^a, can with a finger of the same hand operate either push button 26 or 26^a without releasing his hold on grip 17^a. This arrangement is important as it enables the operative either to raise or lower the ladle while pouring.

34 is a suitable limit switch connected into the circuit by a cable 34^a and adapted to be operated by a lever 35 pivoted at 35^a. Connected to the end of lever 35 is an operated rod 36 which projects through a hole in the pin 12. At opposite ends of rod 36 are spring cushioned nuts 37 adapted to be engaged by pin 12. With this arrangement it will be seen that when pin 12 reaches a certain high position representing the limit for upward travel of the ladle, it will engage upper nut 37 thereby turning lever arm 35 to open switch 34 and stop the motor, and that when pin 12 reaches a predetermined low position it will engage the lower nut 37 and through rod 36 turn lever 35 to open switch 34 and stop the motor.

In the use of the invention ladle 14 is filled with molten metal and the operative, holding the ladle by its handle 7 after the manner indicated in Fig. 1, pours the molten metal into molds 3 one after another, the ladle being turned in hook 15^a by means of the hand of the operative which grasps handle grip 17^a. The ladle is moved from mold to mold by moving platform 5 along the track. This is done by the operative moving along with the ladle. To move the mechanism along the track does not require that the operative release his hold on the ladle handle. To raise or lower the ladle the operative pulls on either handle 30 or 33 thereby closing one or the other of the switches 26 and 26^a. For example, closing switch 26 may serve to operate the motor 20 to turn rod 7 in a direction to move nut 9 upward thereby lifting the ladle, while the closing of the switch 26^a may operate motor 20 in the opposite direction so as to lower the ladle. Since handles 30 and 33 are directly adjacent to grip 17^a, the operative can easily move either without loosening his hold on the ladle handle, and this even though at the time he is turning the ladle for pouring. This arrangement of the ladle handle switch control we regard as being one important feature of our invention, since by this arrangement the operative at all times has the mechanism under direct and immediate control. As already pointed out, the operative can by this arrangement effect raising or lowering of the ladle at the same time he is pouring and without in any way interfering with the pouring operation.

It will be noted that the motor control panel and other mechanism are carried by overhead platform 5. This is a very desirable arrangement in that it positions the mechanism overhead where it is out of the way. Also in connection with the device, it will be noted that it is simple in construction and compact in arrangement. At the same time, however, it puts the ladle under direct and immediate control of the operative at all times.

In accordance with the provisions of the patent statutes, we have described the principle of operation of our invention, together with the apparatus which we now consider to represent the best embodiment thereof; but we desire to have it understood that the apparatus shown is only illustrative and that the invention may be carried out by other means.

What we claim as new and desire to secure by Letters Patent of the United States, is:

1. A ladle crane comprising a platform, an electric motor carried by the platform, vertically adjustable supporting means carried by the platform and depending therefrom, means connecting the motor to said supporting means for adjusting the same, a foundry ladle having a handle supported by said supporting means, and switch means for the motor carried by said handle.

2. In a supporting and control mechanism for a foundry ladle, a platform, a threaded rod depending from and rotatably mounted in the platform, an electric motor carried by the platform, means connecting the motor to the rod for turning the rod, a travelling nut on the rod, means for holding the nut from turning, a supporting member having a swivel connection with the nut, a foundry ladle having a handle supported by said supporting means, and switch means for the motor carried by said handle.

3. In a supporting and control mechanism for a foundry ladle, a platform, an electric motor carried by the platform, vertically adjustable supporting means carried by the platform, means connecting the motor to said supporting means for adjusting the same, a foundry ladle having a handle supported by said supporting means, a grip at the end of said handle, switch means for the motor carried by said handle, and operating means for the switch means located adjacent to said grip.

4. In a supporting and control mechanism for a foundry ladle, a platform, a casing depending from the under side of said platform and provided with a vertical slot, a threaded rod located in said casing and rotatably mounted in the platform, an electric motor carried by the platform, means connecting the motor to the rod for turning the rod, a traveling nut on the rod, a pin connected to said nut and projecting through the slot in the casing for holding the nut from turning, a supporting member carried by the nut, a foundry ladle having a handle supported by said supporting member, and switch means carried by said handle.

5. In a supporting and control mechanism for a foundry ladle, a platform, a casing depending from the lower side of said platform, said casing having a vertical slot, a threaded rod in the casing rotatably mounted in said platform, an electric motor carried by the platform for turning said rod, a traveling nut on the rod, a pin carried by the nut and projecting through the slot in said casing for holding the nut from turning, means for supporting a foundry ladle on said nut, a limit switch for the motor carried by said platform, means actuated by said pin for operating the limit switch, and means for controlling said motor.

6. In combination, a platform, an electric motor, vertically adjustable supporting means carried by the platform and depending therefrom, means connecting the motor to said supporting means for adjusting the same, a device having a handle supported by said supporting means, and switching means for the motor carried by said handle.

7. In combination, a platform, an electric motor, vertically adjustable supporting means carried by the platform and depending therefrom, means connecting the motor to said supporting means for adjusting the same, a device having a handle supported by said supporting means, a grip at the end of the handle, switch means for the motor carried by said handle, and operating means for the switch means located adjacent to said grip.

In witness whereof, we have hereunto set our hands this 10th day of April, 1928.

WILLIAM HEGARTY.
GEORGE E. DEISEROTH.