

March 8, 1932.

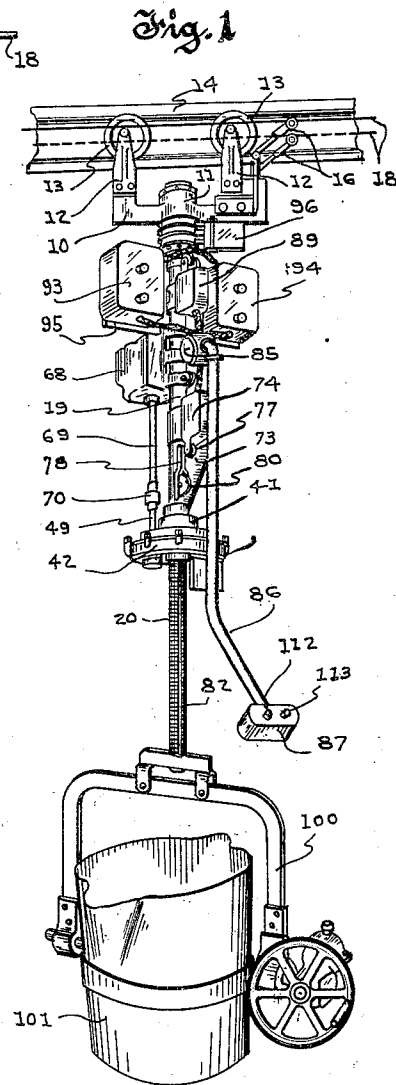
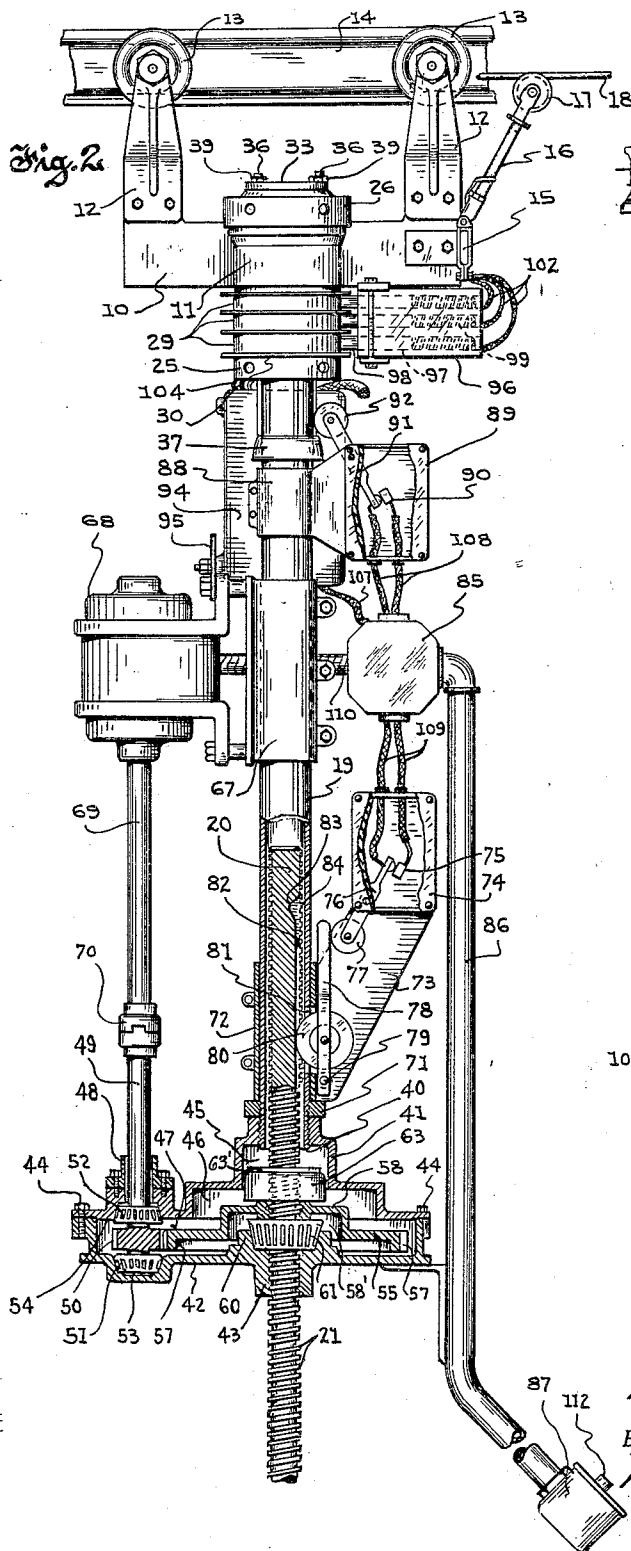
M. W. GOLDBERG

1,848,249

AUTOMATIC POURING DEVICE

Filed Sept. 3, 1929

3 Sheets-Sheet 1



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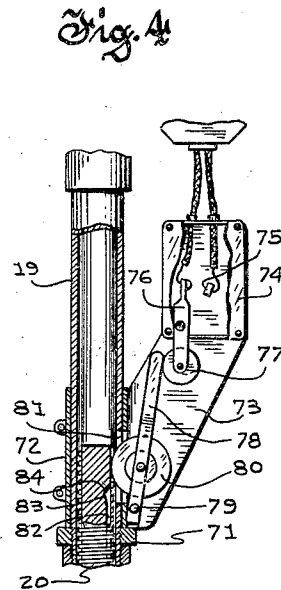
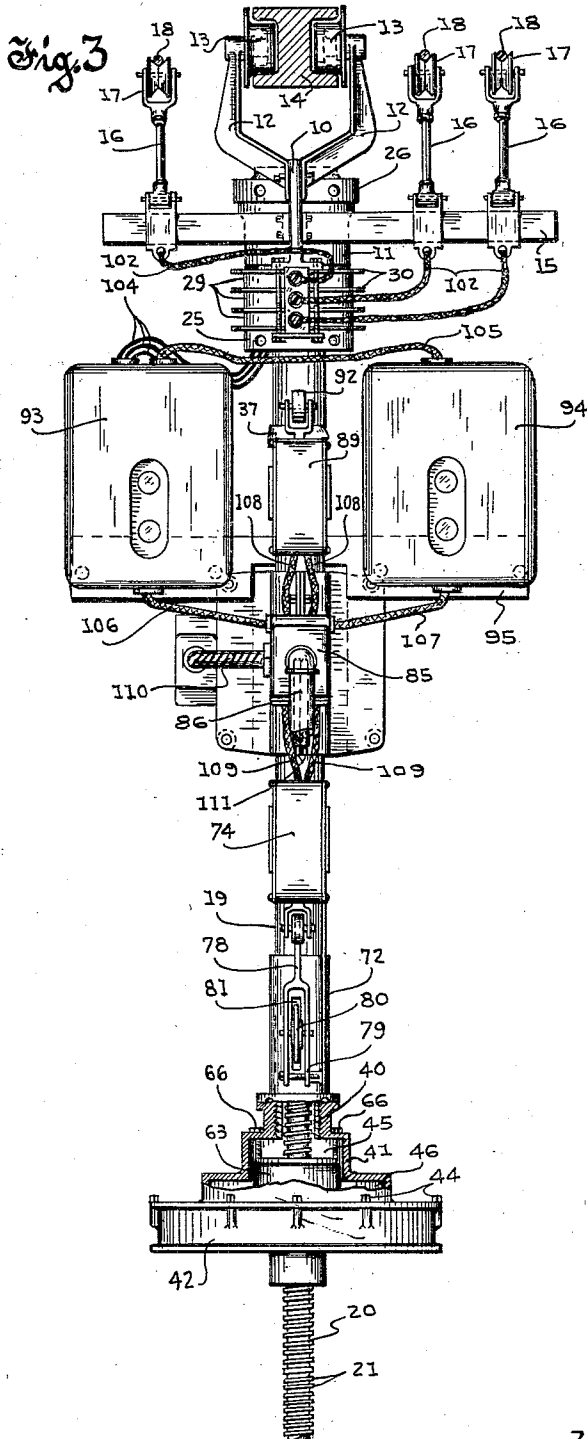
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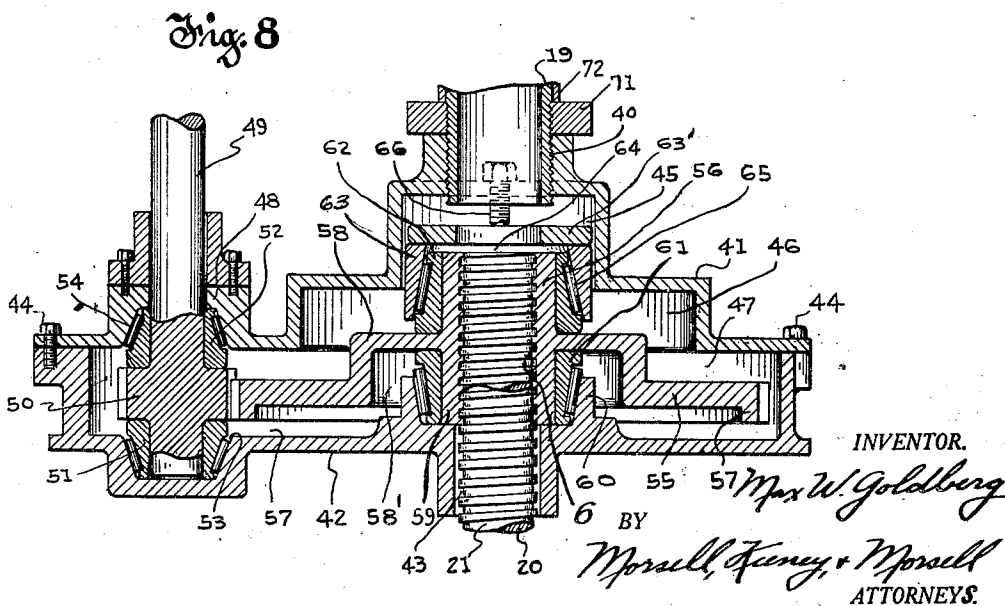
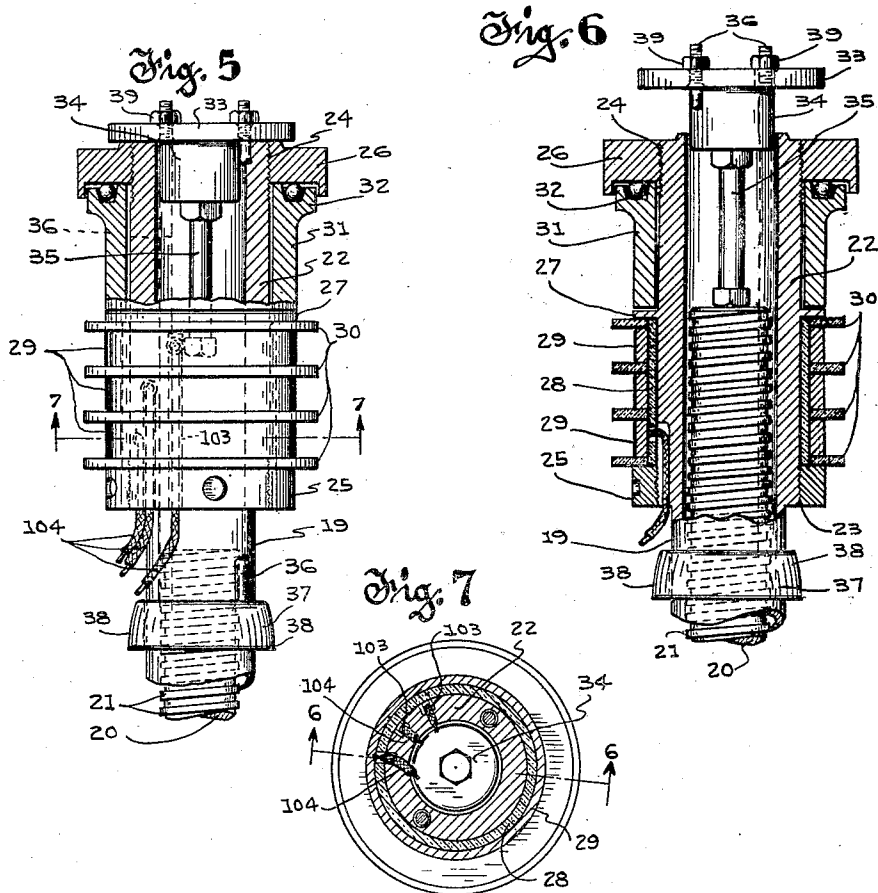
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UNITED STATES PATENT OFFICE

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AUTOMATIC POURING DEVICE

Application filed September 3, 1929. Serial No. 390,053.

This invention relates to improvements in automatic pouring devices.

It is one of the objects of this invention to provide an improved pouring device for use in conveying and pouring molten metal in foundries, in which automatic means is provided for raising and lowering the ladle.

A further object of this invention is to provide an automatic pouring device having means for automatically stopping the movement of the ladle holding rod when said rod has been either raised or lowered to a predetermined point.

A further object of this invention is to provide an automatic pouring device which is electrically operated and which has means for conducting current from an overhead trolley to the device, the said means permitting swivelling of the entire device on its support to facilitate pouring.

A further object of this invention is to provide an automatic pouring device in which a novel type of housing is provided for the driving gears.

A further object of this invention is to provide an automatic pouring device which is efficient in operation, and well adapted for the purpose described.

With the above and other objects in view, the invention consists of the improved automatic metal pouring device, and all its parts and combinations, as set forth in the claims, and all equivalents thereof.

Some of the novel features disclosed, but not specifically claimed herein, form the subject matter of copending application Serial No. 417,582, filed December 30, 1929.

In the accompanying drawings, illustrating one complete embodiment of the preferred form of the invention, in which the same reference numerals designate the same parts in all of the views:

Fig. 1 is a perspective view of the entire device;

Fig. 2 is an enlarged front view thereof, parts being broken away and parts being shown in section;

Fig. 3 is an enlarged side view of the device, parts being broken away and parts being shown in section;

Fig. 4 is a detail view showing the lower limit switch in open position, parts being broken away and parts being shown in section;

Fig. 5 is a detail view of the upper portion of the device, parts being broken away, and parts being shown in section;

Fig. 6 is another detail view of the upper portion of the device taken on line 6-6 of Fig. 7, showing the ladle holding rod in completely raised position;

Fig. 7 is a sectional view taken on line 7-7 of Fig. 5; and

Fig. 8 is a vertical sectional view through the lower gear housing.

Referring to the drawings, the numeral 10 designates a supporting portion having a central bearing 11 and having supporting arms 12 extending upwardly from each end thereof, said supporting arms carrying rotatably mounted wheels 13 which ride in an overhead rail 14. Secured to one end of the supporting member 11, and extending transversely thereof, is a bar 15 on which trolley members 16 are slidably mounted. The said trolley members carry trolley wheels 17 at their upper ends which are adapted to engage with trolley wires 18.

The device proper comprises a tubular member 19 within which a ladle holding rod 20 is carried. The said ladle holding member is provided with threads 21. The upper end of the tubular member 19 is enlarged as at 22, and has a lower threaded portion 23 and an upper threaded portion 24. Nuts 25 and 26 are threaded on the portions 23 and 24 respectively. The enlarged portion 22 of the tubular member 19 is also provided with a shoulder 27. Positioned between said shoulder 27 and the nut 25 is an insulating sleeve 28. Rings 29, which surround said sleeve, are formed of a suitable electrical conducting material. The said rings are spaced apart by insulating disks 30 (see Figs. 5 and 6). Positioned between the shoulder 27 and the nut 26 is a sleeve 31 having an enlarged upper end portion 32. The said sleeve 31 is positioned within the bearing portion 11 of the support 10, the enlarged portion 32 of said sleeve resting on the upper end of said

bearing 11 and preventing downward movement of the device, and also providing a swivel connection between the supporting member 10 and the device proper.

5 A disk 33 is provided with a downwardly projecting hub portion 34 which fits within the interior of the tubular member 19. Extending downwardly from said hub is a rod 35. Rods 36 extend downwardly from the disk 33 through bores in the enlarged portion 22 of the tubular member 19 and have their lower ends secured to a collar 37. The said collar loosely surrounds the sleeve 19, and is provided with downwardly diverging sides 38. 10 Nuts 39 are threaded on the upper ends of the rods 36 and secure said rods to the disk 33.

The lower end of the tubular member 19 is threaded as at 40 to receive the upper portion of the lower gear housing 41. The lower 20 portion 42 of said gear housing is provided with a central opening 43, and is secured to the upper portion of the housing by means of bolts 44. The upper portion of the gear housing is of step formation to provide a plurality of chambers 45, 46 and 47 therewithin. 25 At one side of the upper gear housing 41 is a bearing 48 for the drive shaft 49. The said drive shaft carries a rigidly mounted gear 50 near its lower end. On each side of the gear 30 are roller bearing members 51 and 52 which are received by pockets 53 and 54 of the housing. The gear 50 meshes with a larger gear 55 which has an interiorly threaded central bore 56 within which the ladle holding rod 21 is threaded. The toothed portion of the gear 35 55 extends downwardly below the lower face of the gear, as at 57. The central portion of the gear is stamped upwardly, as at 58, to form an annular recess 58' surrounding the hub 59 of the gear, the latter extending both 40 above and below the upwardly stamped portion 58.

The lower portion of the gear housing 42 is provided with an upwardly extending annular portion 60. A roller bearing 61 is positioned within said ring and between the same and the hub 59 of the gear 55. Another roller bearing 62 surrounds the upper portion of the hub 59. An inverted cup-shaped member 63, having a central opening 64 and having its inner sides tapering as at 65, is positioned over the roller bearing 62 to hold the same in place. A washer 63' is positioned 50 above said cup-shaped member. Bolts 66, extending from the upper surface of the upper portion 41 of the gear housing, extend within the chamber 45 and bear against the top of the washer 63'. By turning said bolts 60 the cup-shaped member may be forced downwardly to adjust the amount of friction between its tapering sides and the roller bearing.

Surrounding an intermediate portion of the tubular member 19 is a bracket 67 on 65 which a driving motor 68 is supported. The

said driving motor has a downwardly extending drive shaft 69, which is connected by means of a coupling portion 70 with the drive shaft 49 extending upwardly from the gear housing.

Threaded on the tubular member 19, above the gear housing, is a bushing 71, and surrounding the tubular member 19, above said bushing, is a sleeve 72. An arm 73 extends angularly upwardly from said sleeve, said arm 75 carrying a contact box 74 on its upper end. Within said box is a fixed contact 75 and a pivoted movable contact 76, the lower end of said movable contact projecting from the bottom of the box and being provided with a wheel 77. An arm 78 has its lower end pivoted to the lower portion of the arm 73 as at 79. Rotatably mounted on an intermediate portion of said arm is a wheel 80. The upper 85 end of the arm 78 is adapted to engage the wheel 77 of the movable contact member 76.

The wheel 80 extends through a slot 81 in the sleeve 72 and in the tubular member 19 and rides within a groove 82 which extends longitudinally of the ladle holding rod. At 90 the upper end of the rod and communicating with said groove is a recess 83 forming a shoulder 84. When the ladle holding rod reaches the limit of its downward movement, the wheel 80 engages the shoulder 84 and is forced 95 outwardly. This causes the upper end of the arm 78 to engage the wheel 77 and to cause movement of the movable contact 76 to break the connection within the contact box 74.

A conduit box 85 projects from the tubular member 19, and has extending downwardly therefrom a pipe 86, the lower end of said pipe carrying a switch box 87. 100

A bracket 88 secured to the tubular member 19 carries a contact box 89, said contact box having a fixed contact 90 therewithin and a pivoted movable contact member 91. The latter member has its upper end extending through the top of the box 89 and carries a wheel 92. When the ladle holding rod has reached the limit of its upward movement, its upper end engages the lower end of the rod 35 extending from the disk 33 (see Fig. 6). This causes said disk to be pushed upwardly and through the rods 36 which have their 110 lower ends connected to the collar 37. The said collar is moved upwardly, its tapering side engaging the wheel 92 of the contact member 91 and causing the contact within the box 89 to be opened. 115

Starter switches 93 and 94 of the usual construction, one being arranged to cause operation in one direction and one being adapted to cause operation in the reverse direction, are supported from the upper portion of the tubular member 19 by means of a supporting bar 95 which is secured at a central portion to the tubular member 19. 120

Extending from the lower portion of the support 10 at one end thereof is a contact 130

support 96 having a plurality of bores 97 within which contact members 98 are slidably positioned, said contact fingers having their inner ends engaging coiled springs 99 in the usual manner. The outer ends of said contact fingers engage the ring-shaped contacts 29 on the upper end of the sleeve 19.

On the lower end of the rod 21 a bail 100 is carried, and within said bail a ladle 101 is pivotally mounted.

The trolley members 16 are connected by wires 102 with the contact fingers 98. The said contact fingers, which frictionally engage the rings 29, conduct the electricity from the trolley thereto. The enlarged upper portion 22 of the tubular member 19 is formed with grooves 103. Within said grooves wires 104 are positioned (see Figs. 5, 6 and 7), the said wires having one end in connection with the contact rings 29 and having their other ends extending downwardly and connected with the starter box 93. The starter box 93 is connected by a conduit 105 with the starter box 94. Conduits 106 and 107 extend from the starter boxes 93 and 94 to the conduit box 85. Wires 108 extend from the limit switch box 89 to the conduit box 85, and wires 109 extend from the limit switch box 74 to the conduit box 85. Suitable connections are made between said conduit box 85 and the motor 68 by means of a conduit 110, and wires 111 extend downwardly through the pipe 86 to the switch box 87 on the lower end thereof. The said switch box 87 is provided with a button 112 which is adapted to bring the starter 93 into operation to cause downward movement of the ladle, and with a button 113 which is adapted to bring the starter 94 into operation to cause upward movement of the ladle.

The operation of the device is, as follows:

The pouring device may be moved along the overhead rail 14 to a desired position adjacent the molds which are to be poured. The device is then swiveled within the bearing 11 to a desired angle. It is to be noted that this swivelling of the device does not in any way interfere with the conducting of the current from the overhead trolley wires, inasmuch as the contact rings 29 and fingers 98 have been provided to permit this swivelling. In moving the device along the overhead rail and in swivelling the same, the operator uses the pipe 86 which is conveniently shaped to provide an operating handle. The operator then presses the button 112, which, through the starter 93, causes the electric motor 68 to operate. This causes rotation of the gear 50 and the larger gear 55. As the ladle holding rod is threaded within the gear 55, rotation of said gear causes the ladle holding rod to be moved downwardly with the tubular member 19 to lower the ladle 101. The said ladle holding rod will be automatically moved downwardly until the wheel 80 has en-

gaged the shoulder 84 to cause separation of the contacts 76 and 75. This will automatically stop the motor 68.

After the molds have been poured, if it is desired to raise the ladle, the operator presses the button 113. This brings the motor 68 again into operation, but in a reverse direction through the reverse starter 94. Accordingly the ladle holding rod 21 is raised until its upper end engages the lower end of the rod 35 to cause upward movement of the disk 33, rod 36 and collar 37. The latter engages the wheel 92 on the contact lever 91 to separate the contacts 90 and 91 and stop the motor.

From the above description it may be seen that a very difficult problem has been solved in providing an electrical pouring device in which current is supplied from overhead trolley wires in such a way that swivelling of the pouring device is in no manner interfered with. It is further to be noted that the stopping of the device in either direction is automatically accomplished. It is also to be noted that a novel form of lower gear housing has been provided in which, due to the peculiar shape of the housing and gears, oil is prevented from escaping through the lower opening 43 of the housing. It is to be further noted that the bearing 62 may be adjusted by turning the bolt 66 to force the inverted cup-shaped member 63 downwardly.

Although only one form of the invention has been shown and described, it is not desired to be limited to this exact showing, and it is to be understood that all changes and modifications are contemplated as may fairly come within the scope of the claims.

What I claim is:

1. A metal pouring device comprising a frame, a vertically movable ladle supporting rod carried by said frame, said rod having a shoulder thereon, electric motor means for automatically moving said rod to adjust the height of the ladle, and a limit switch in connection with said motor and carried by said frame and adapted to be engaged by the shoulder on said rod when the latter has moved a predetermined distance to cut off the supply of current to the electric motor.

2. A metal pouring device comprising a frame, a vertically movable ladle supporting rod carried by said frame, electric motor means for automatically moving said rod to adjust the height of the ladle, a limit switch in connection with said motor and carried by said frame, and means adapted to be engaged by the upper end of said rod when the latter has been moved upwardly a predetermined distance and engageable with said limit switch to cut off the supply of current to the electric motor.

3. A metal pouring device comprising a frame, a tubular member carried by said frame, a ladle supporting rod vertically

movably positioned within said tubular member, electric motor means for automatically moving said rod to adjust the height of the ladle, a limit switch in connection with said motor and carried by said frame, a downwardly projecting member movably positioned within the upper end of said tubular member, a collar loosely surrounding said tubular member and connected with the downwardly projecting member, said collar being movable upwardly upon engagement of the upper end of the material supporting rod with the downwardly projecting member, and said collar when so moved being engageable with the limit switch to cut off the supply of current to the electric motor.

4. A metal pouring device comprising a frame, a gear having a threaded bore rotatably positioned in said frame, a threaded ladle supporting rod in threaded connection with the bore of said gear, and motor means for rotating said gear to cause movement of said ladle supporting rod to adjust the height of the ladle.

5. A metal pouring device comprising a frame, a tubular member carried by said frame, a gear housing in connection with said tubular member, a gear having a threaded bore positioned in said housing, a threaded ladle supporting rod slidably carried within said tubular member and having a threaded connection with the bore of said gear, and motor means for rotating said gear to cause movement of the ladle supporting rod within the tubular member to adjust the height of the ladle.

6. A metal pouring device comprising a frame, a tubular member carried by said frame, a gear housing carried by the lower end of said tubular member, said housing having an upper opening communicating with the interior of the tubular member and having a lower opening, said lower opening being surrounded by an inwardly extending annular portion, a gear having a threaded bore and having an upwardly stamped portion surrounding said bore, said upwardly stamped portion of the gear being positioned above the inwardly extending annular portion of the housing and said construction preventing lubricant within the housing from escaping through the lower opening of the housing, a threaded ladle supporting rod slidably carried within said tubular member and being threaded through the bore of the gear, the lower portion of said rod extending through the lower opening of the housing, and motor means for rotating said gear to cause movement of the ladle supporting rod within the tubular member to adjust the height of the ladle.

7. A metal pouring device comprising a frame, a tubular member carried by said frame, a gear housing carried by the lower end of the tubular member, said housing hav-

ing an upper opening communicating with the interior of the tubular member and having a lower opening, a gear having a threaded bore, a threaded ladle supporting rod slidably carried within said tubular member and being threaded through the bore of the gear, the lower portion of said rod extending through the lower opening of the housing, a bearing member loosely surrounding said rod both above and below the gear, means for vertically adjusting said bearings, and motor means for rotating the gear to cause movement of the ladle supporting rod within the tubular member to adjust the height of the ladle.

8. A metal pouring device comprising a frame, a vertically movable ladle supporting rod carried by said frame, electric motor means for automatically moving said rod to adjust the height of the ladle, a limit switch in connection with said motor and carried by said frame, and means in connection with the rod engageable with said limit switch when the rod has moved a predetermined distance to cut off the supply of current to the electric motor.

9. A metal pouring device comprising a movable supporting portion, a frame pivotally connected thereto, a ladle supporting rod carried by said frame and movable substantially coaxially with respect to said pivotal connection, an electric motor in connection with said frame, means between said motor and said ladle supporting rod for causing movement of the latter upon operation of the electric motor to adjust the height of the ladle, and means including rotary contact members embodied in the pivotal connection between the frame and the supporting portion for conveying electricity from an outside source to the electric motor without interfering with the pivotal movement of the frame on the support, said pivotal movement of the frame on the support providing for rotation of the ladle to vary the position of the spout thereof without varying the position of the ladle.

In testimony whereof, I affix my signature.

MAX W. GOLDBERG.