Nov. 3, 1925.

1,560,241

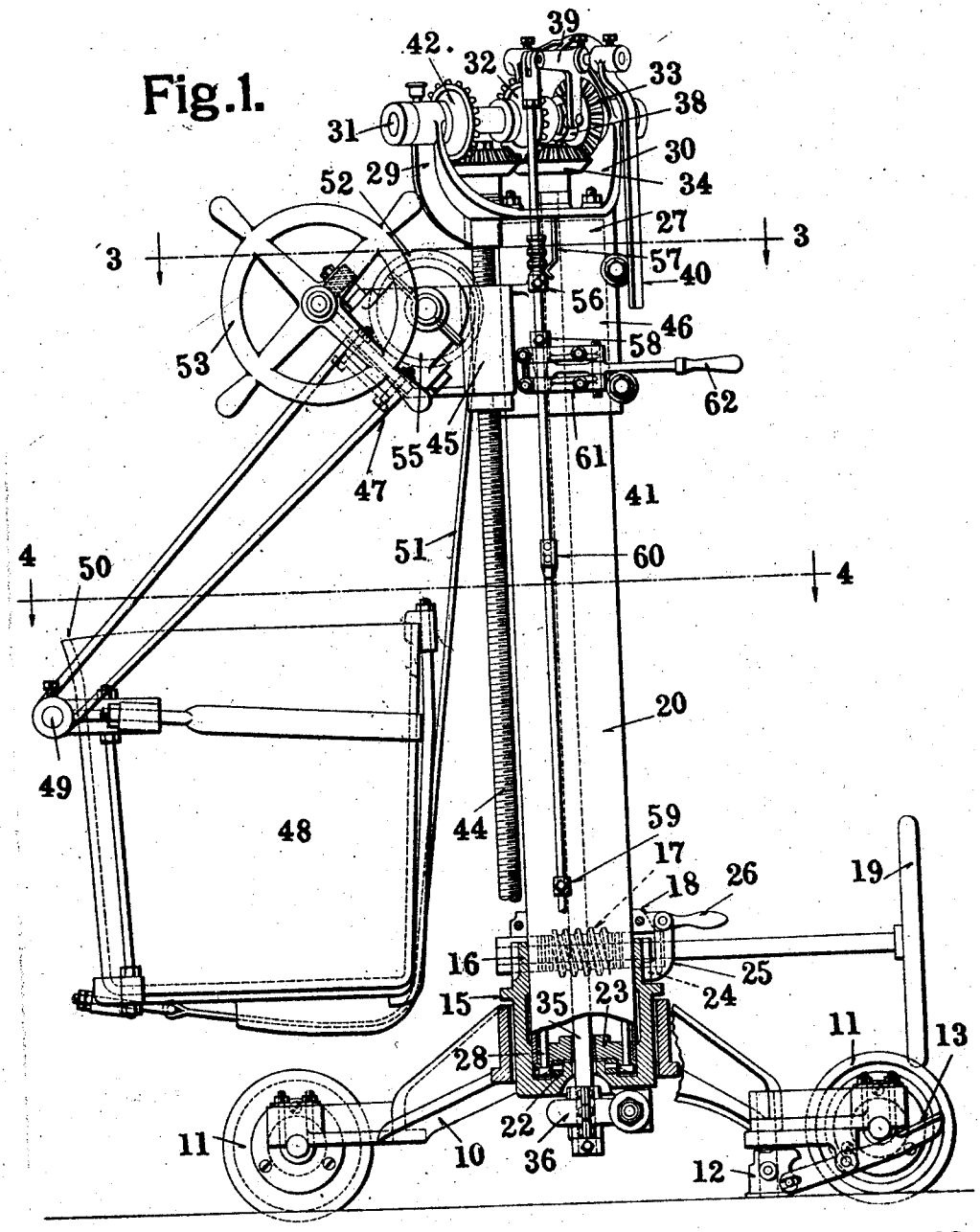
A. JONES

LADLE CARRIER

Filed Feb. 15, 1924

3 Sheets-Sheet 1

Fig.1.



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Fig.2.

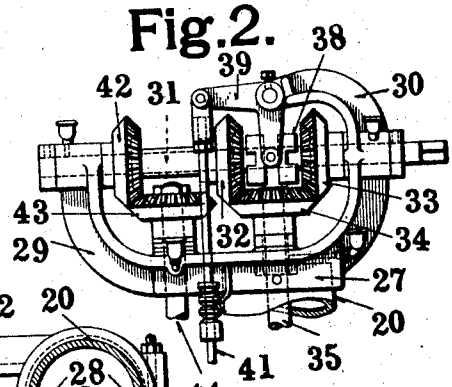


Fig.3.

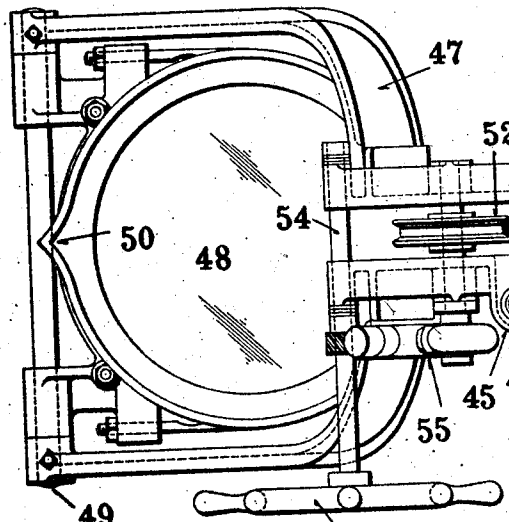
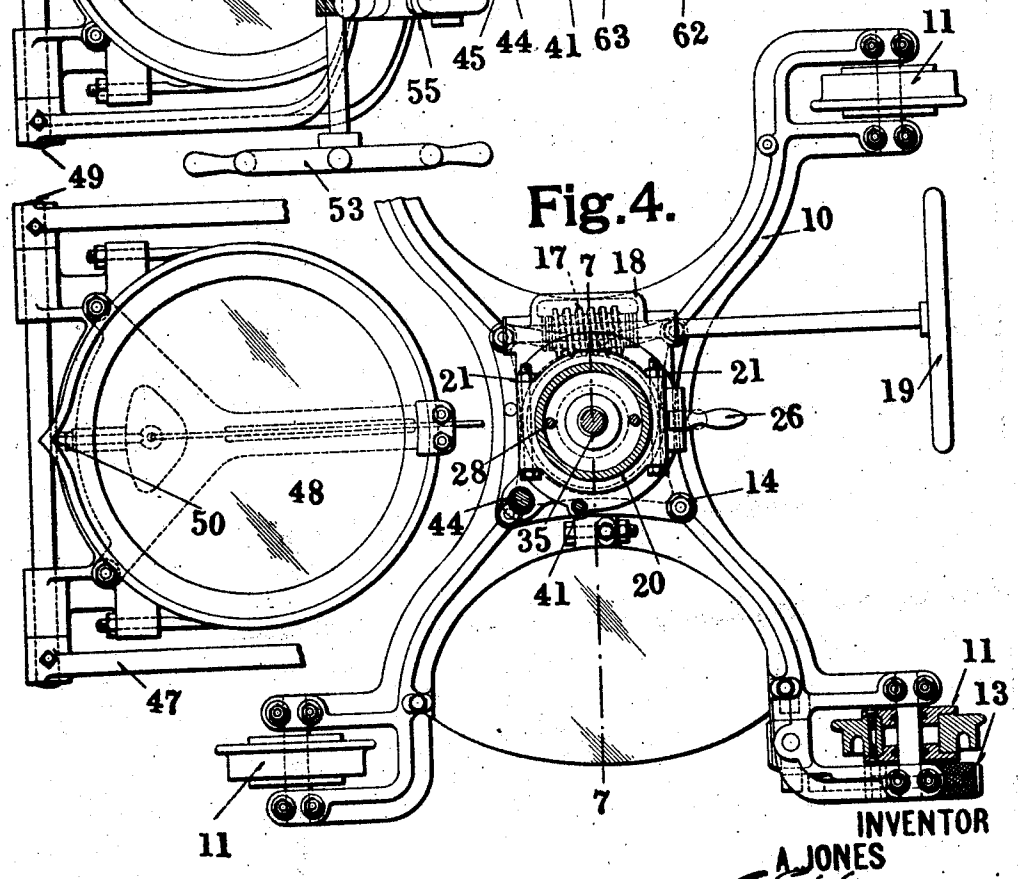


Fig.4.



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Fig.5.

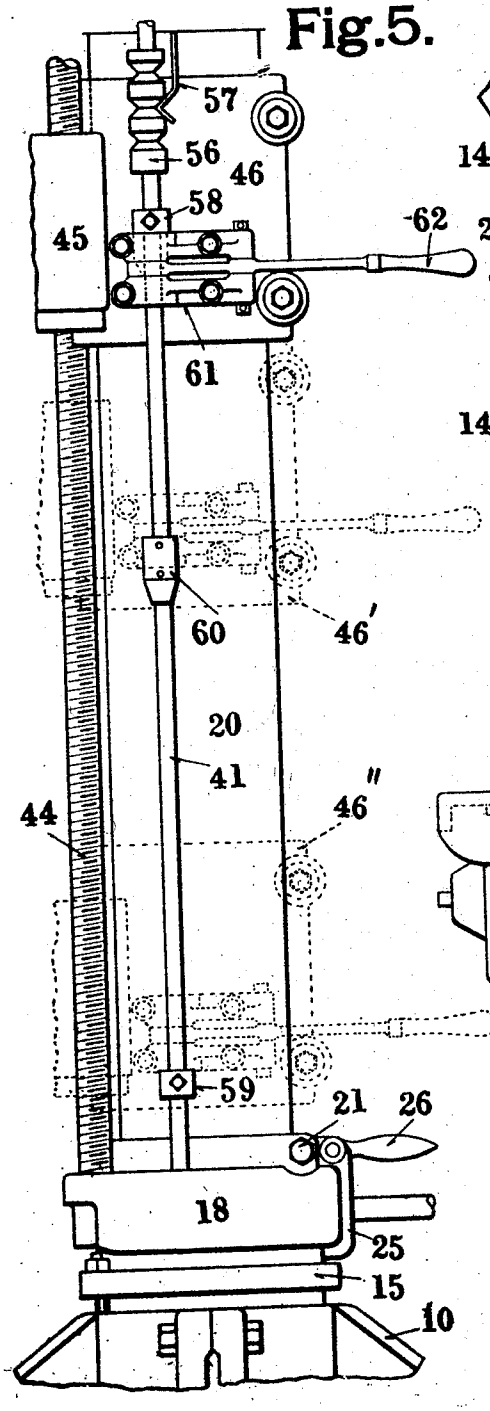


Fig.6.

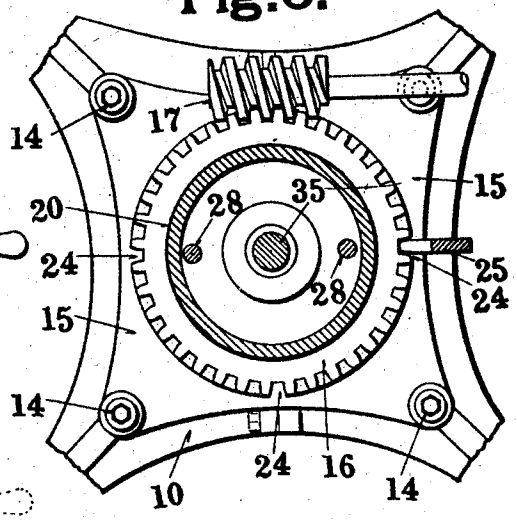
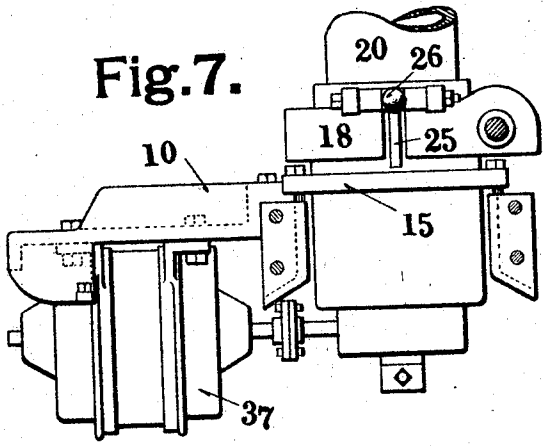


Fig.7.



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Patented Nov. 3, 1925. 1,560,241

UNITED STATES PATENT OFFICE.

ARTHUR JONES, OF BELLEVILLE, ILLINOIS, ASSIGNOR TO U. S. SMELTING FURNACE COMPANY, OF BELLEVILLE, ILLINOIS, A CORPORATION OF ILLINOIS.

LADLE CARRIER.

Application filed February 15, 1924. Serial No. 693,104.

To all whom it may concern:

Be it known that I, ARTHUR JONES, a citizen of the United States of America, residing at the city of Belleville, county of St. Clair, State of Illinois, United States of America, have invented a certain new and useful Ladle Carrier, of which the following is such a full, clear, and exact description as will enable anyone skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to a ladle carrier and particularly to one of the type in which the ladle is raised and lowered by motor driven mechanism preferably automatically controlled and in which the rotation of the device as well as the tilting of the ladle is performed either manually or is manually controlled.

In the accompanying drawings, which illustrate one form of ladle carrier made in accordance with my invention, Figure 1 is a side elevation, a portion of the base being shown in section; Figure 2 is a detailed view of the reversing gearing; Figure 3 is a section taken on the line 3—3 of Figure 1; Figure 4 is a section taken on the line 4—4 of Figure 1; Figure 5 is an enlarged view of the column, the sleeve being shown in different positions in dotted line; Figure 6 is an enlarged detailed view of the driving gear; and Figure 7 is a section taken on the line 7—7 of Figure 4.

The base 10 of the device is provided with wheels 11 preferably flanged to run upon a track. A brake 12 controlled by a foot lever 13 serves to hold the device stationary while the ladle is being filled and discharged. Mounted on the base 10 by bolts 14 is a table 15 having an upwardly extending toothed flange 16 forming a worm wheel engaging with a worm 17 mounted in a yoke 18 and actuated by a hand wheel 19. The yoke 18 is formed in two parts adapted to fit around a hollow cylindrical column 20 and firmly clamped thereto by bolts 21. Column 20 is rotatably mounted in the table 15 and is preferably supported by an anti-friction bearing 22 (Figure 1) placed between the end plug 23 of the column and the bottom of the recess in the table 15 into which the lower end of the column extends. In order to lock the column against rotation four of the teeth on the flange 16 are provided with extensions 24, as shown in Figure 6, to engage with a detent 25 pivoted to the yoke 18 and provided with a handle 26.

Mounted on the top of the column 20 is a cap 27 held in position by the rods 28 extending down through the column and engaging with the plug 23. Cap 27 is provided with a pair of brackets 29 and 30 respectively, forming bearing for a horizontal shaft 31 on which is loosely mounted two miter gears 32 and 33, each meshing with a third miter gear 34 rigidly secured to a shaft 35 extending centrally through the column 20 and driven through worm gearing contained in casing 36 from a motor 37 mounted beneath the base 10, as shown in Figure 7. Mounted on the shaft 31, to rotate therewith, and situated between the miter gears 32 and 33, is a clutch 38 adapted to engage with either of said gears by longitudinal movement. The movement of the clutch is controlled by a bell-crank lever 39, which may be actuated either manually by a handle 40, or automatically by a rod 41 pivoted to one arm thereof. A miter gear 42 rigidly secured to the shaft 31 meshes with a miter gear 43 on a threaded rod 44 journaled at its upper end in the cap 27 and at its lower end in the yoke 18.

The threaded rod 44 engages with an internally threaded lug 45 on a sleeve 46 sliding on the column 20. The sleeve 46 carries a cradle 47 to which the ladle 48 is pivoted. The pivot point 49 is arranged adjacent to the pouring lip 50 of the ladle so that when the contents of the ladle are poured out, the tilting of the ladle will change the position of the lip but slightly. Tilting of the ladle is controlled by a cable 51 wound around a pulley 52, which pulley is rotated from a hand wheel 53 on shaft 54 by means of spiral and worm gearing contained in casing 55, forming a part of the cradle 47. Carried on the rod 41 is a cylindrical member 56 provided with three V-shaped circumferential grooves cooperating with a spring detent 57. The grooves in the member 56 are so spaced that when the detent is in engagement with the central groove the clutch 38 will be held out of engagement with both the wheels 32 and 33. When the detent is in engagement with the lower groove the clutch will engage with the wheel 32, and when the detent is in engage-

ment with the upper groove the clutch will engage with the wheel 33. The rod 41 also carries upper and lower stops 58 and 59 respectively, and an intermediate stop 60. The stops 58, 59 and 60, as well as the member 56, are adjustable on the rod 41 by setscrews; the latter, however, needs no further adjustment after having been properly positioned, while the three former are adjusted to variously limit the vertical movement of the ladle. 61 is a control bracket carried on the sleeve 46 and provided with a lever 62 normally held in the position shown in Figure 3 by a spring 63. The frame of the bracket 61 is adapted to come into contact with the stop 58 in its upward movement, and with the stop 59 in its downward movement to move the clutch into neutral position. The frame of the bracket is so shaped as to pass over the intermediate stop 60, which is slightly less in diameter than the stops 58 and 59. In the downward movement of the sleeve the lever 62 contacts with the stop 60 unless the said lever is moved out of normal position by the handle and thus serves to automatically move the clutch in the neutral position to stop the vertical movement of the ladle at an intermediate point of its travel. In the upward movement of the ladle, however, the lever will be automatically thrown out so as to pass over the stop 60 owing to the conical form of the lower end of the stop and the corresponding conical form of the semicircular groove in the end of the lever.

The operation of my ladle carrier is briefly as follows:

Current is supplied to the motor 37 to actuate the same continuously during the operation of the device. Power from the motor is communicated to the shaft 35 through gearing 36 so that the said shaft is continuously rotated to drive the gears 32 and 33 from the gear 34. As the gears 32 and 33 are loosely mounted on the shaft 31 the said shaft remains stationary as long as the clutch 38 is in neutral position. When it is desired to raise or lower the ladle the clutch is moved into engagement with either the wheel 33 or the wheel 32 by means of the handle 40. Assuming the parts to be in the position shown in Figure 1, if it is desired to lower the ladle the clutch 38 is moved into engagement with the wheel 32 which will rotate the rod 44 in the proper direction to lower the sleeve 46 carrying the cradle 47 and its attached ladle 48. When the sleeve 46 reaches the position indicated in dotted lines 46′ (Figure 5) the lever 62 will contact with the stop 60 unless said lever is moved laterally out of the path of the stop, and thus move the rod 41 longitudinally to disengage the clutch 38 from the wheel 32 and thus arrest the movement of the sleeve, the parts being held in this position by the engagement of the detent 57 with the central groove on the cylindrical member 56. If the lever is moved out of the path of this stop the parts will continue their movement until arrested either by manual operation of the lever 40 automatically by contact of the frame 61 with the stop 59 when the sleeve has reached the position indicated at 46″ (Figure 5). After the ladle has been filled the clutch 38 is thrown into engagement with the wheel 33 to raise the sleeve. In its upward movement the lever 62 will pass over the stop 60 without actuating the rod 41, as has been hereinbefore set forth. If not previously arrested by the manual operation of the handle 40 the sleeve will be automatically brought to rest by the contact of the frame 61 with the stop 58.

To rotate the column 20 to the proper position to pour the metal from the ladle 48, the handle 26 is lifted to disengage the detent 25 from the recess 24 and the worm 17 is actuated by means of hand wheel 19 until the ladle is brought into the desired position. The ladle is now tilted on its pivot 49 by rotating the hand wheel 53, which through the gearing in the casing 55 rotates the pulley 52 thus winding up the cable 51.

Having fully described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. In a device of the class described, the combination with a travelling base, of a rotary support carried thereon, a ladle pivotally mounted on said support, power actuated means for raising and lowering said ladle, automatically actuated means for limiting the vertical movement of the ladle, said means comprising a pair of end stops and an intermediate stop, and means for tilting said ladle.

2. In a device of the class described, the combination with a travelling base, of a rotary support carried thereon, a ladle pivotally mounted on said support, power actuated means for raising and lowering said ladle, automatically actuated means for limiting the vertical movement of the ladle, said means comprising a pair of end stops and an intermediate stop, means for throwing the intermediate stop out of operative position, and means for tilting said ladle.

3. In a device of the class described, the combination with a base, of a rotary support carried thereon, a vertically movable member mounted on said support, a ladle carried by said member, a motor on said base for actuating said vertically movable member, and automatically controlled reversing means interposed between said motor and member.

4. In a device of the class described, the combination with a base, of a rotary support carried thereon, a vertically movable member mounted on said support, a ladle carried by said member, a motor on said base for

actuating said vertically movable member, reversing gear interposed between said motor and member, manually actuated means for controlling said reversing gear, and automatic stop mechanism also controlling said reversing gear.

5. In a device of the class described, the combination with a travelling base, of a rotary column carried thereon, a sleeve surrounding said column, a ladle supported by said sleeve, a motor mounted on the base, a driving shaft extending through the column and actuated by said motor, and reversing gearing interposed between said rod and shaft.

6. In a device of the class described, the combination with a travelling base, of a rotary column carried thereon, a sleeve surrounding said column, a ladle supported by said sleeve, a motor mounted on the base, a driving shaft extending through the column and actuated by said motor, reversing gearing interposed between said rod and shaft, and automatic controlling means for said reversing gearing.

7. In a device of the class described, the combination with a travelling base, of a rotary column carried thereon, a sleeve surrounding said column, a ladle supported by said sleeve, a motor mounted on the base, a driving shaft extending through the column and actuated by said motor, reversing gearing interposed between said rod and shaft, and automatic controlling means for said reversing gearing, said controlling means including a pair of end stops and an intermediate stop.

8. In a device of the class described, the combination with a base, of a column carried thereon, manually operated gearing for rotating said column, means for locking said column in a plurality of positions relative to the base, a sleeve surrounding said column, a ladle carried by said sleeve, means for raising and lowering said sleeve, said means including reversing gearing, automatic control for said reversing gearing, and means for tilting said ladle.

9. In a device of the class described, the combination with a travelling base, of a rotary column carried thereon, a sleeve slidingly mounted on said column, a ladle supported from said sleeve, a motor on said base, a driving shaft extending through said column and actuated by said motor, a threaded rod for raising and lowering said sleeve, reversing gearing interposed between said driving shaft and rod, and means for tilting said ladle.

10. In a device of the class described, the combination with a travelling base, of a rotary column carried thereon, a sleeve slidingly mounted on said column, a ladle supported from said sleeve, a motor on said base, a driving shaft extending through said column and actuated by said motor, a threaded rod for raising and lowering said sleeve, reversing gearing interposed between said driving shaft and rod, manually actuated means for controlling said reversing gearing, automatically actuated means also controlling said reversing gearing, said automatically actuated means comprising a pair of end stops and an intermediate stop, and means for tilting said ladle.

In testimony whereof, I have hereunto set my hand this the 13th day of February, 1924.

ARTHUR JONES. [L. S.]