

Nov. 25, 1930.

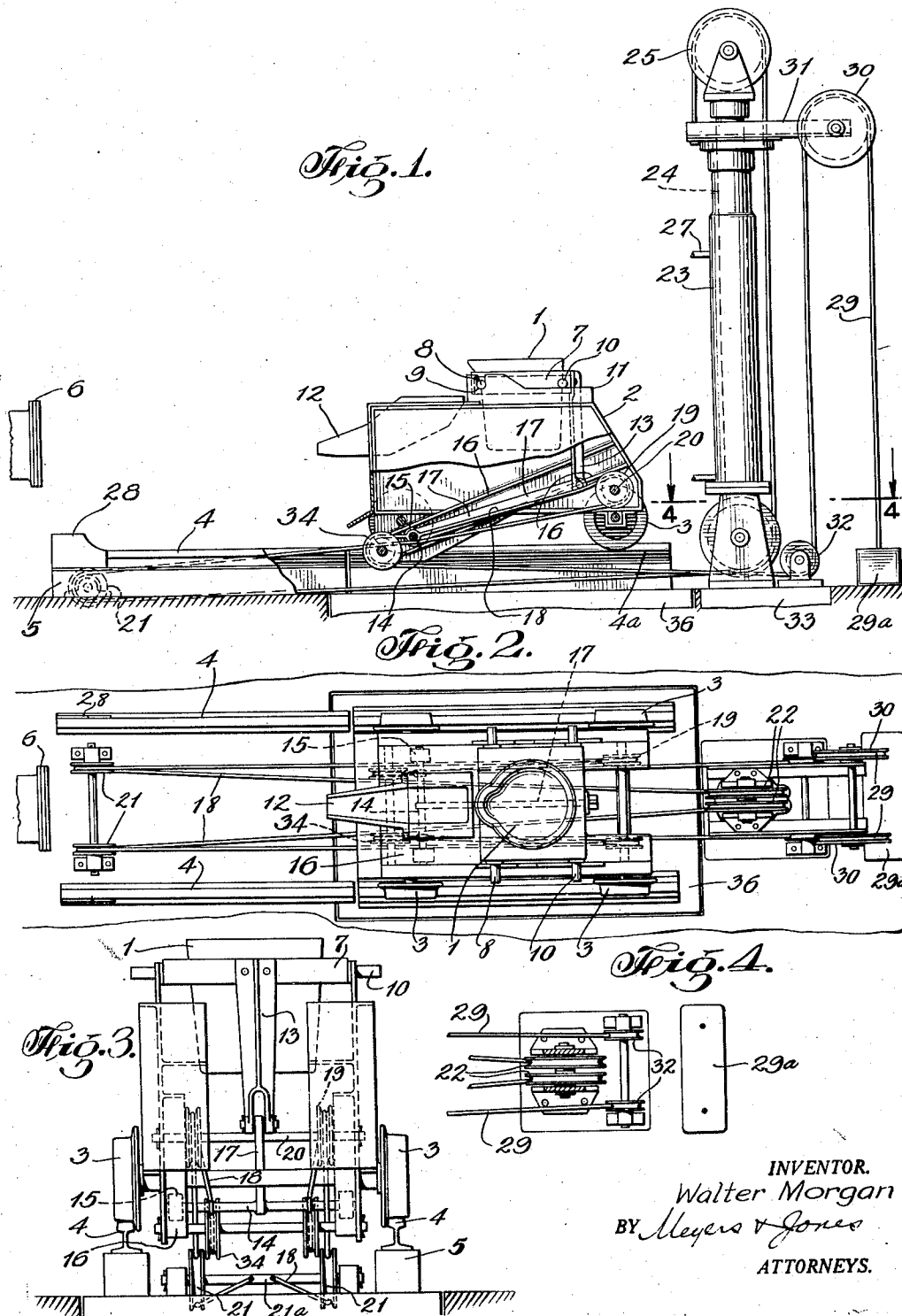
W. MORGAN

1,783,128

LADLE TIPPING DEVICE FOR CASTING MACHINES

Filed Dec. 7, 1928

2 Sheets-Sheet 1



INVENTOR.
Walter Morgan
BY *Meyers & Jones*
ATTORNEYS.

Nov. 25, 1930.

W. MORGAN

1,783,128

LADLE TIPPING DEVICE FOR CASTING MACHINES

Filed Dec. 7, 1928

2 Sheets-Sheet 2

Fig. 5.

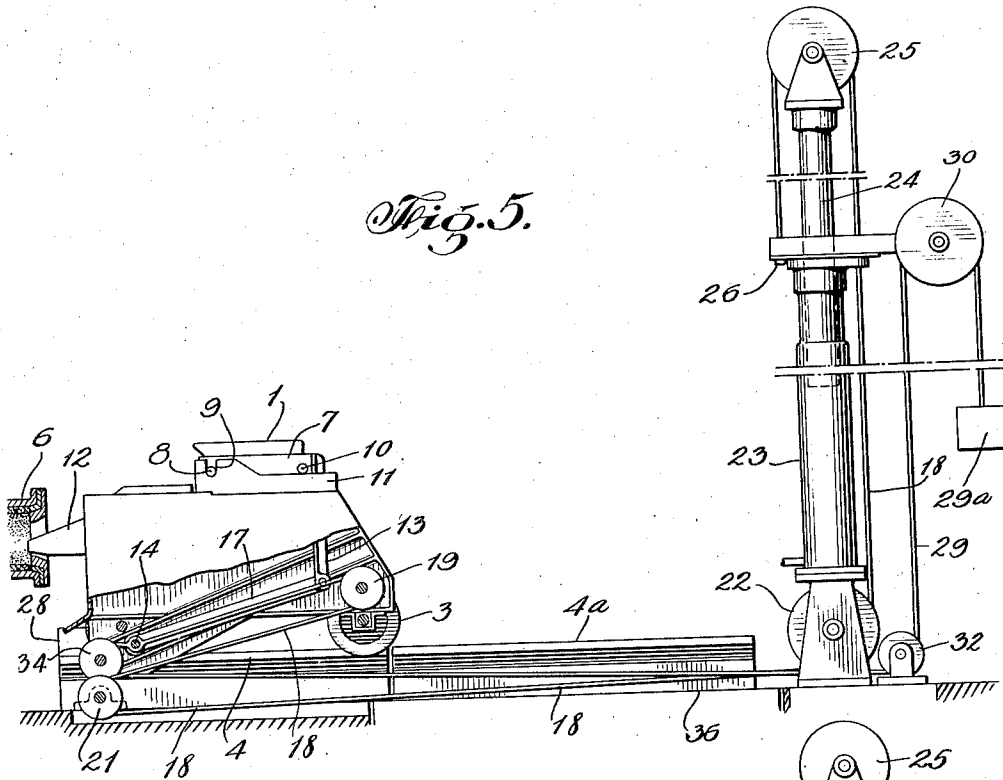
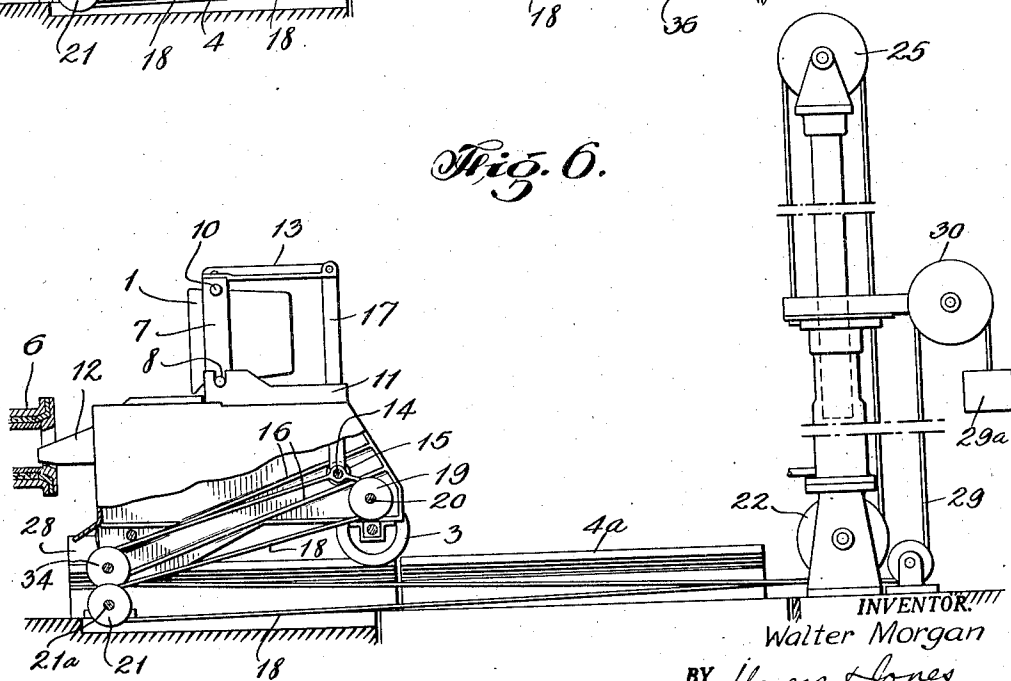


Fig. 6.



INVENTOR
Walter Morgan
BY *Meyers & Jones*
ATTORNEYS.

UNITED STATES PATENT OFFICE

WALTER MORGAN, OF BIRMINGHAM, ALABAMA, ASSIGNOR TO AMERICAN CAST IRON PIPE COMPANY, OF BIRMINGHAM, ALABAMA, A CORPORATION OF GEORGIA

LADLE-TIPPING DEVICE FOR CASTING MACHINES

Application filed December 7, 1928. Serial No. 324,463.

This invention is an improvement in ladle tipping devices for casting machines, and more particularly in machines for casting hollow bodies, such as pipes.

In known casting machines, it is usual to connect the ladle support to the machine, and in centrifugal casting especially, the ladle is subjected to the vibration of the machine, which tends to injure the linings of the ladle.

After each pouring operation, the ladle must be cleaned and refaced, and it is desirable that to enable these operations, the ladle be separate from the machine, and capable of removal to a certain distance therefrom.

The ladles when used in making large castings, are usually heavy, and it is desirable in order to prevent jarring of the linings when returning them to normal position, that the ladle be always under control, both in tilting and in returning to normal position.

One of the primary objects of the present invention is the provision of a wheel-supported tiltable ladle arranged to move upon a track or guideway toward and from the machine, to alternately receive a charge of molten metal and discharge it into the mold.

Another object is the provision of a construction wherein a common means is provided for first moving the ladle toward the casting machine and for afterwards tipping it to discharge the contents thereof.

Another object is the provision of a common means to first restore the tilted ladle to normal position, and to afterwards return it into position to receive another charge of molten metal.

Another object is the provision of a construction wherein a single controlling element is provided for initiating the sequence of movements of the ladle from normal position to a position of discharge and through the return movement.

Another object is the provision of a construction such that the ladle may be removed to any required distance from the machine after the discharge of its contents, to enable unobstructed access thereto.

Another object is the provision of a construction such as will enable the use of a sep-

arate scale, or a scale forming a part of the ladle support.

With these and other objects in view the invention consists in the construction and novel combination of parts fully described herein- after, illustrated in the accompanying draw- ings, and pointed out in the claims appended hereto, it being understood that various changes in the form, proportion, size and minor details of construction within the scope of the claims, may be resorted to without departing from the spirit of the invention.

In the drawings forming a part hereof:—

Fig. 1 is a side elevation of the improved device showing the parts in loading posi- tion.

Fig. 2 is a plan view.

Fig. 3 is an end view looking from the rear.

Fig. 4 is a section on the line 4—4 of Fig. 1.

Fig. 5 is a view similar to Fig. 1, showing the device in discharging position.

Fig. 6 is a view similar to Fig. 1, showing the parts with the ladle tipped.

In the embodiment of the invention shown in the drawings, the ladle 1 is supported in the body of the top of a car, having wheels 3, which run upon rails 4, the said rails being supported upon stringers 5, which are arranged at the end of the casting machine, (not shown) so that the car moves toward and from the machine, in the axis of the mold indicated at 6.

The ladle is supported in a substantially rectangular frame 7, which has a pair of oppositely arranged trunnions 8 at the end adjacent the mold resting in seats 9 on the body 2 of the car. A second pair of trunnions 10 is arranged at the rear of the frame, and these rest upon stops 11 on the car body, when the ladle is in normal position. The contents of the ladle are discharged through a pouring spout 12, mounted on the car body, into the mold, when the device is in discharging position. The frame 7 has a depending arm 13 at the rear thereof, the said arm being rigid with the frame, and mechanism for tipping the ladle is connected with the arm.

The said mechanism comprises a shaft 14, extending transversely of the car body, and having at its ends wheels 15, each of which

runs between a pair of guides 16 on the car body, and it will be noticed referring to Fig. 1, that the pairs are inclined upwardly toward that end of the car body remote from the mold. The arrangement is such that when the wheels 15 and the shaft 14 roll rearwardly in the guides, they will be elevated by the guides as clearly shown in Fig. 6. The depending arm 13 is connected at its lower end to the shaft 14 by a link 17, so that when the shaft 14 moves rearwardly as above described, the arm 13 will be moved in a direction to tilt the ladle, as shown in Fig. 6.

A pair of flexible members 18 is connected with the shaft 14 in spaced relation, and these members pass rearwardly over a pair of grooved rollers 19 on a shaft 20 supported by the car body. It will be noticed referring to Fig. 1, that in the position of the car remote from the mold the rollers 19 are at a higher level than the shaft 14, so that the pull on the shaft 14 which moves it upward and rearward in the guide 16 is substantially direct.

From the wheels 19 the flexible members 18 pass forwardly and downwardly over grooved rollers or wheels 21 on a shaft 21^a supported by the stringers 5 on bearings before mentioned, and at the ends of the stringers adjacent the mold. From thence the members pass rearwardly beneath grooved wheels 22 at the bottom of a cylinder 23, in which is arranged a piston 24 having at its upper end a pair of grooved wheels or rollers 25. The flexible members pass over the rollers 25 to a connection with the cylinder indicated at 26. The cylinder is supplied with fluid under pressure, as for instance, water, by means of a pipe 27, controlled by a suitable valve not shown, and it will be apparent that when the piston is moved upward, the traction of the flexible members 18 will first move the car toward the mold, that is, to the position of Fig. 5. Stops or bumpers 28 are provided at the ends of the rail adjacent the mold against which the forward wheels of the car abut when the car is in position for the tipping of the ladle.

Further movement of the piston, and further traction on the flexible members, will move the shaft 14 rearwardly and upwardly in the guides 16. Through the connection of the link 17 with the shaft and the depending arm 13, the ladle will be tipped, as shown in Fig. 6, to discharge the contents thereof through the pouring spout 12, into the mold. The car is moved into discharging position and the ladle is tipped or tilted by the upward movement of the piston, and the ladle is returned to normal position, and the car into receiving position, by a counterweight 29^a.

Flexible members 29 are connected to the ends of the counterweight and from thence pass upwardly over grooved wheels or rollers 30 journaled on brackets 31 at the top

of the cylinder. The flexible members then pass downwardly beneath wheels 32 on a fixed support 33 which also supports the cylinder. The flexible members then pass forwardly under and back over grooved rollers 34 on the car body, to a connection with the shaft 14, before mentioned. It will be apparent that when the cylinder 23 is opened to exhaust, the downward movement of the counterweight will first restore the ladle to normal position, moving the shaft 14 forwardly. As soon as the ladle is in normal position, the traction is directly on the car, and the car is moved away from the mold to the position shown in Fig. 1, where another charge of molten metal is inserted, from the usual bull ladle. The relation of the abutments or bumpers 28 with respect to the casting machine is such that when the forward wheels of the car engage the bumpers, the spout 12 will be inserted in the open end of the mold in the machine.

Thus when the ladle is tipped, the contents pass from the spout directly into the mold. The car and ladle when in the position of Fig. 1, may be upon a scale indicated generally at 36, which carries continuations of the rails 4 indicated at 4^a. It will be apparent, however, that a scale might be used in connection with the car itself, forming a part thereof.

In operation, with the car in its normal position shown in Fig. 1, a selected charge is deposited in the ladle by any suitable means as for instance, a bull ladle. Water is then admitted to the cylinder 23, and the car is immediately moved toward the mold, and into the position of Fig. 5. Further movement of the piston tips the ladle, as shown in Fig. 6, and the charge is inserted in the mold. As soon as the cylinder begins to exhaust, the counterweight comes into action, first restoring the ladle to normal position, and then returning the car into position to receive another charge.

What is claimed as new is:—

1. A charging device for use in a casting machine, including a tiltable ladle movable toward and from the machine, means for guiding the ladle and a common means to first move the ladle toward the machine along the guiding means and to afterwards tilt it to discharge the contents thereof.

2. A charging device for use in a casting machine, including a tiltable ladle movable toward and from the machine, means for guiding the ladle, a common means to first move the ladle toward the machine along the guiding means and to afterwards tilt it to discharge the contents thereof, and counterweighted means for first restoring the ladle to normal position and afterwards moving the same away from the machine.

3. In combination with a casting machine, a wheel supported tiltable ladle movable

toward and from the machine, a common means to first move the ladle toward the machine, and to afterwards tilt it to discharge the contents thereof, and a second means to first restore the ladle to normal position, and to afterwards move it away from the machine.

4. In combination with a casting machine, a ladle movable toward and from the machine, means for guiding the ladle, and means moving in one direction to first move the ladle along the guiding means into discharging position at the machine and to afterwards discharge the contents thereof.

5. In combination with a casting machine, a ladle movable toward and from the machine, means for guiding the ladle, means moving in one direction to first move the ladle along the guiding means into discharging position at the machine and to afterwards discharge the contents thereof, and other means to return the parts to normal position.

6. In combination with a casting machine, a pouring spout adapted to be inserted in the end of a mold, a ladle, a common support for the spout and the ladle upon which the ladle is mounted to tilt to deliver into the spout, said support movable toward and from the mold, means for guiding the support in its movement and a common means for first moving the support toward the mold and for afterwards tilting the ladle to discharge the contents thereof through the spout.

7. In combination with a casting machine, a pouring spout adapted to be inserted in the end of a mold, a ladle, a common support for the spout and the ladle upon which the ladle is mounted to tilt to deliver into the spout, said support movable toward and from the mold, means for guiding the support in its movement, an abutment for checking the movement of the support when the spout is entered into the end of the mold, and a common means moving in one direction to move the support toward the mold and for moving the ladle to tilt the same when the support engages the abutment.

8. In combination with a casting machine, a pouring spout adapted to be inserted in the end of a mold, a ladle, a common support for the spout and the ladle upon which the ladle is mounted to tilt to deliver into the spout, said support movable toward and from the mold, means for guiding the support in its movement, a common means for first moving the support toward the mold and for afterwards tilting the ladle to discharge the contents thereof to the spout, and gravity controlled means for returning the ladle and the support in sequence to normal position.

9. A charging device for molds, including a support movable toward and from the mold and provided with a pouring spout to deliver to the mold, means for guiding the support

in its movement, a tiltable ladle mounted on the support and positioned to deliver to the spout when tilted, hydraulic means for moving the support toward the mold, and tilting the ladle in sequence, and gravity controlled means for returning the ladle and the support in sequence to normal position.

10. A charging device for molds, including a support movable toward and from a mold and provided with a pouring spout to deliver to the mold, means for guiding the support in its movement, a tiltable ladle mounted on the support and positioned to deliver to the spout when tilted, means to move the support toward the mold, a stop for engagement by the support when the spout is in discharging position with respect to the mold, and means for moving the support into engagement with the stop, said means being connected with the ladle to tilt the same after the movement of the support is checked by the stop.

11. In a charging device for molds, a wheeled car, rails upon which the wheels move, a pouring spout carried by the car, a ladle mounted to tilt to discharge its contents through the spout, said ladle having a depending arm for tilting the same, a wheeled shaft movable longitudinally of the car, means for guiding the shaft in such movement and a connection with the arm whereby when the shaft is moved in one direction the ladle will be tilted, flexible members connected with the shaft and having guided movement to first make traction on the car to move it toward the mold and to afterwards move the shaft to tilt the ladle.

12. In a charging device for molds, a wheeled car, rails upon which the wheels move, a pouring spout carried by the car, a ladle mounted to tilt to discharge its contents through the spout, said ladle having a depending arm for tilting the same, a wheeled shaft movable longitudinally of the car, means for guiding the shaft in such movement and a connection with the arm whereby when the shaft is moved in one direction the ladle will be tilted, flexible members connected with the shaft and having guided movement to first make traction on the car to move it toward the mold and to afterwards move the shaft to tilt the ladle, and a counterweight for reversing the sequence of operations.

Signed at Birmingham, in the county of Jefferson and State of Alabama, this 4th day of December, A. D. 1928.

WALTER MORGAN.