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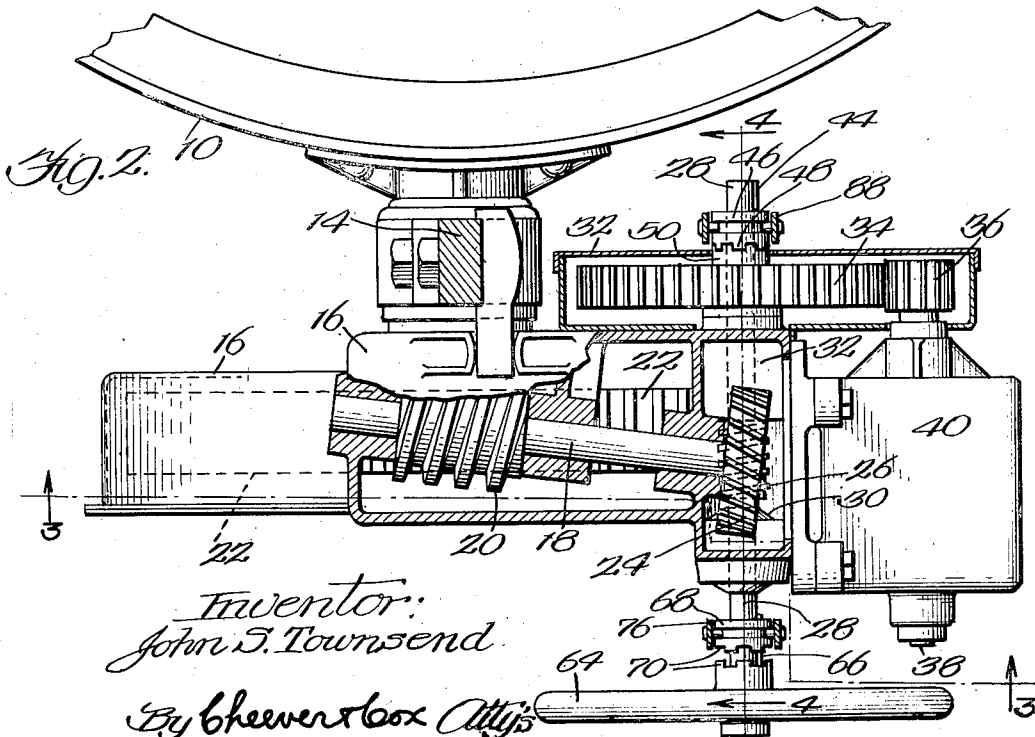
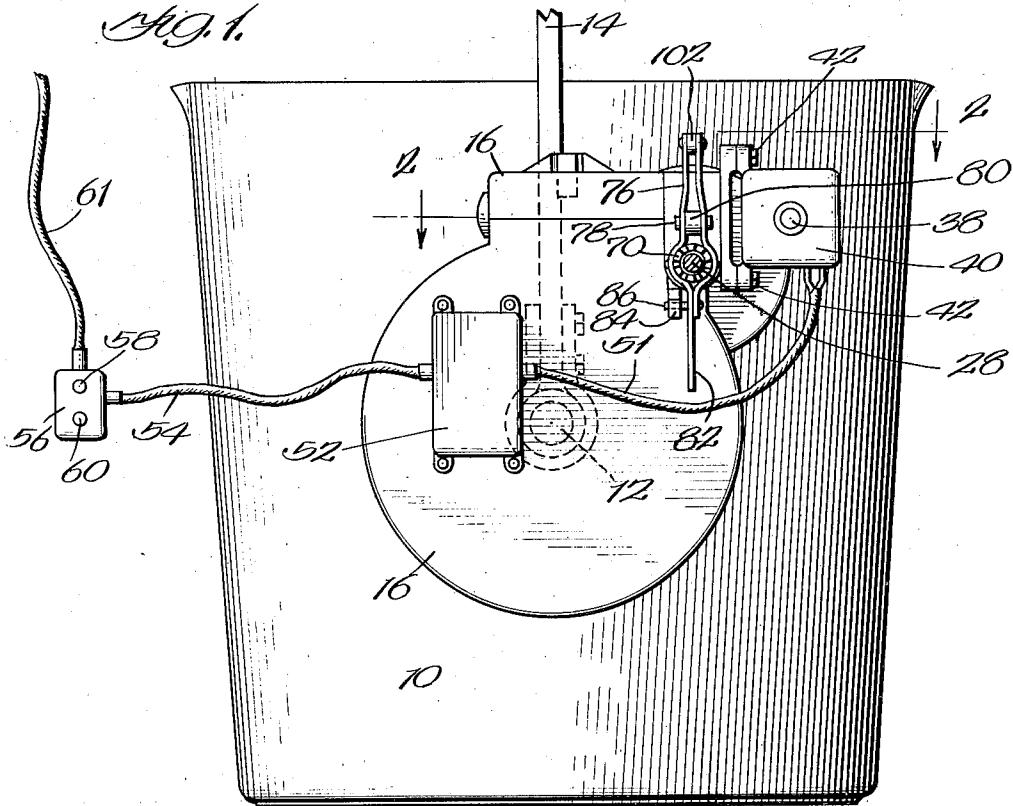
J. S. TOWNSEND

1,472,286

MOTOR DRIVEN LADLE TURNING MECHANISM

Filed June 13, 1921

2 Sheets-Sheet 1



Inventor:
John S. Townsend

By Cheever & Cox Attys

Oct. 30, 1923.

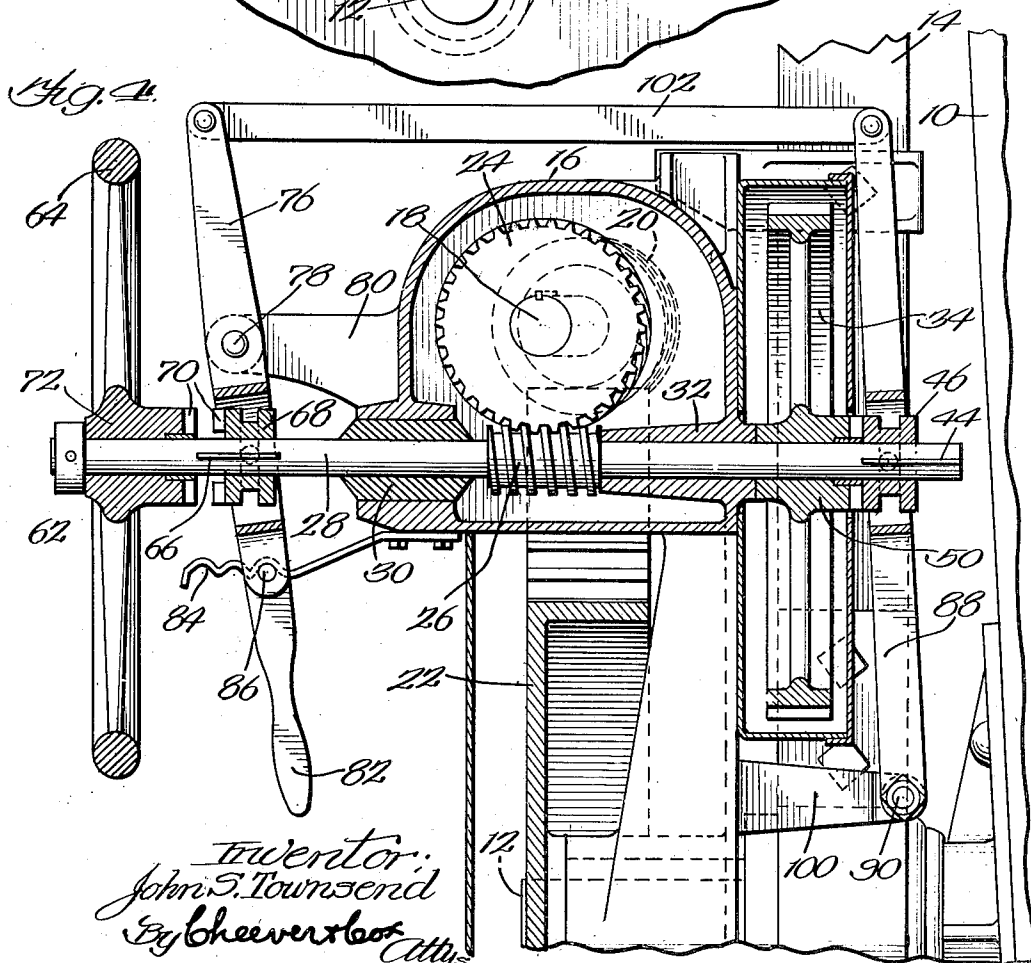
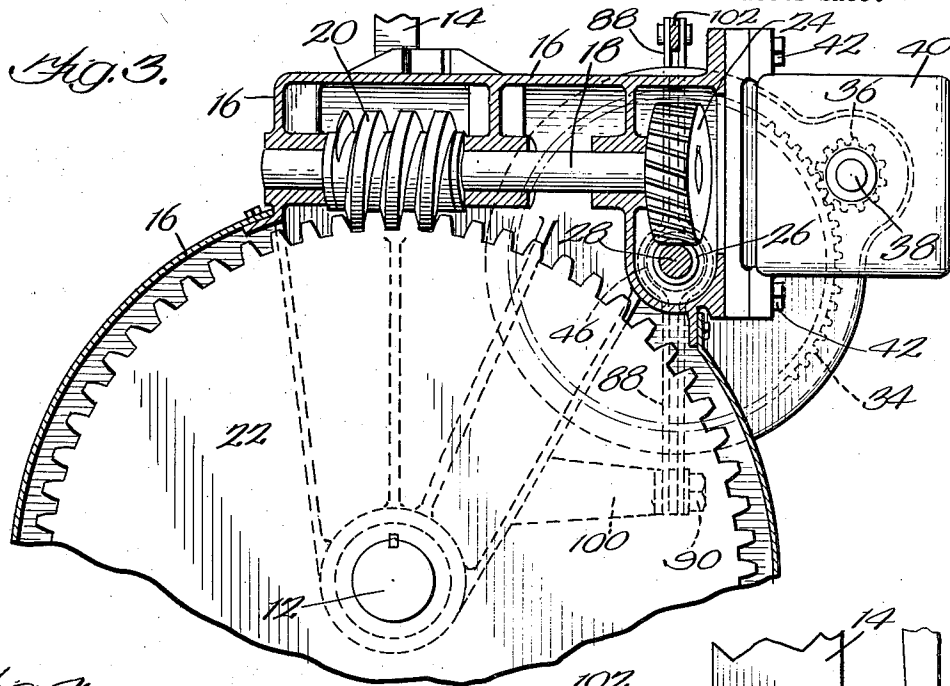
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J. S. TOWNSEND

MOTOR DRIVEN LADLE TURNING MECHANISM

Filed June 13, 1921

2 Sheets-Sheet 2



Inventor:
John S. Townsend
By *Chas. E. Cox* Att'y

UNITED STATES PATENT OFFICE.

JOHN S. TOWNSEND, OF HARVEY, ILLINOIS, ASSIGNOR TO WHITING CORPORATION,
OF HARVEY, ILLINOIS, A CORPORATION OF ILLINOIS.

MOTOR-DRIVEN LADLE-TURNING MECHANISM.

Application filed June 13, 1921. Serial No. 477,051.

To all whom it may concern:

Be it known that I, JOHN S. TOWNSEND, a citizen of the United States, residing at Harvey, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Motor-Driven Ladle-Turning Mechanism, of which the following is a specification.

This invention relates to mechanism for turning ladles used in foundry furnaces and the like containing more or less large bodies of molten metal, where because of the danger of spilling, it is essential that the ladle be at all times under the accurate control of an operator and that said operator be at a substantial distance from the ladle.

The object of the invention is to provide a motor driven mechanism for controlling the ladle, which can under normal conditions be operated by electric switches manipulated by the operator at a distance from the ladle and in which this can be done with perfect control, but in which in the event of defective operation or the failure of electric mechanism, manual power may be substituted in such a way that operation of the ladle may be continued with ease and safety.

Broadly, the invention consists in a ladle turning mechanism equipped for selective operation by electric motor or hand power, the electric motor mechanism being preferably subject to control by an operator working at a distance. The invention further consists in many features and details of construction hereafter more fully set forth in the specification and claims.

Referring to the drawings in which like numerals denote like parts thruout the several views,

Figure 1 is a side elevation of a ladle equipped with mechanism illustrating this invention in its preferred form.

Figure 2 is a sectional plan view on the line 2—2, Figure 1.

Figure 3 is a sectional view taken from approximately the points 3—3, Figure 2.

Figure 4 is an enlarged end view taken from the right hand side of Figure 2 on approximately line 4—4 of that figure.

The preferred form of mechanism shown in the drawings is up to certain points, the same as that shown, described, and claimed in my prior U. S. Patent 1,357,599 for ladle turning mechanism, issued November 2,

1920 and in Whiting and Townsend United States Patent No. 1,323,137, dated Nov. 25, 1919.

As fully set forth in said two prior patents, the invention is especially adapted for the rotation of a ladle 10 on its trunnions 12 in a bale mechanism 14 by which the ladle is suspended from a traveling crane or other suitable support conveniently adaptable for moving the ladle about a foundry for the purpose of pouring metal contained within it into molds for casting.

Suitably mounted upon the hub of gear 22 is a stationary case 16 fully enclosing a horizontal shaft 18 having at one end a worm 20 meshing with a worm wheel 22 rigid on the ladle trunnion 12, and having at its opposite end a worm gear 24 adapted to be operated by mechanism entering into the invention of this application.

Below this gear 24 and meshing with it is a worm 26 rigidly carried on shaft 28, journaled in suitable bearings 30 and 32 carried by the case. Loosely mounted on shaft 28 adjacent to bearing 32 and enclosed within case, is the gear 34 with which meshes pinion 36 on the shaft 38 of an electric motor, diagrammatically represented as 40, attached to the end of the main case 16 by bolts or the like 42. On the end of shaft 28, which is outside the wheel 34 is a spline 44 on which slides a clutch member 46, having clutch teeth 48 interfitting with corresponding clutch teeth on the end of the hub 50 of wheel 34. Whenever clutch member 46 is moved to the left, so that the two sets of teeth 48 intermesh, wheel 34 is locked on shaft 28 and the motor 40 can, therefore, thru the gearing shown, drive the shaft 28, worm 26, worm wheel 24, worm 20, gear wheel 22, and trunnion 12, to tilt the ladle 10. On the other hand, when member 46 is moved to the right as shown in Figure 4, or upward as shown in Figure 2 so that the respective sets of clutch teeth 48 cease to intermesh, wheel 34 is loose on the shaft and shaft 28 can be rotated by other means to rotate the ladle without interfering with or moving the electric motor, and conversely the motor can be manipulated without affecting the ladle.

The electric motor 40 is operatable by electric current supplied to it thru electric cable 51, box 52, cable 54 of standard construction

and therefore not shown in detail. The current so delivered passes thru control switch 56 and two control push buttons 58 and 60, adapted on being alternately pushed to control electric current delivered thru cable 61 to the parts 51, 52, 54 in such a manner that the motor can be reversed in direction of rotation, depending on which button is used, to selectively cause ladle to rock in one direction or the other, as desired by the operator.

The opposite or left end of shaft 28 is provided with a collar 62 against which, loosely rotates on the shaft, a hand wheel 64 adapted to be grasped by the operator, to rotate the wheel about the central axis of shaft 28. On shaft 28 adjacent to this wheel 64 is another spline 66, along which travels another clutch member 68, provided with clutch teeth 70 interfitting with corresponding teeth on the hub 72 of the wheel 64, whereby when these sets of clutch teeth 70 are in mesh the operator rotating hand wheel 64, rotates shaft 28 and consequently the ladle, and when the clutch teeth are separated, as shown in Figure 4, the wheel 64 is freely rotatable on the shaft without any control over the ladle.

Means are provided for automatically simultaneously shifting the two clutches, 46 and 68, so that, as shown in the drawings both clutches are never in mesh at the same time. The particular embodiment of mechanism for this purpose here shown includes an operating lever 76 pivoted at 78 to a suitable support 80 and operatively connected to clutch 68. The operator can, by taking hold of handle 82 rock the handle about the pivot 78, against the resistance of a spring 84, engaging a pin 86, on the lever, to move the clutch member 68 from the disengaged position of Figure 4 to the left into engaged position and vice versa. On the other end of the shaft 28 operatively engaging the clutch 46 is another lever 88, suitably pivoted at 90 to a fixed support 100, adapted to be rocked about the pivot 90 to move the clutch member 46 from the engaged position of Figure 4 to the right into disengaged position. These two levers are connected by a connecting rod 102, which causes them to move in unison, when the operator moves handle 82 to the left, as viewed in Figure 4, to move clutch 68 to cause clutch teeth 70 to intermesh, he thereby simultaneously moves clutch member 46 to the right to disengage clutch teeth 48. The operator can, therefore, manipulate handle 82 to selectively attach the wheel 64 in operative relation on shaft 28 so that he can manually rotate shaft 28 to turn the ladle while the motor is out of control of the ladle and he can by reversing the position of lever 82 attach the motor to shaft 28 and disengage the hand wheel. This is very important

should the motor break down, while the ladle with molten metal in it is being manipulated.

By the use of two worm gears at different points of the mechanism an effective brake is produced and maintained on the ladle to prevent its turning in either direction except when manipulated by the use of the motor or the hand wheel.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. In mechanism of the class described, a suspending device for a ladle, the ladle tiltable on the suspending device, gearing mechanism for tilting the ladle with reference to the suspending mechanism, manually operatable mechanism for operating the tilting mechanism, motor driven mechanism for operating the tilting mechanism, and clutch devices selectively operatable to cause the motor or the manual mechanism, but never both at the same time, to operate the tilting mechanism.

2. In mechanism of the class described, a tiltable ladle, a suspending device therefor, gearing transported by the suspending device for tilting the ladle with reference to the suspending device, a shaft adapted to operate the gearing, additional motor driven gearing on one portion of said shaft, a hand manipulatable shaft operating member at another part of said shaft, and an independent clutch mechanism for connecting each of said last mentioned devices in operative working relation with said shaft, and means for simultaneously operating said clutches, to throw one into, the other out of operating position.

3. In mechanism of the class described, a tiltable ladle, a suspending device therefor, gearing transported by the suspending device for tilting the ladle with reference to the suspending device, a shaft parallel to the tilting axis of the ladle adapted to operate the gearing, additional motor driven gearing on one portion of said shaft, a hand manipulatable shaft operating member on the end of said shaft most remote from the ladle, an independent clutch mechanism for connecting each of said last mentioned devices in operative working relation with said shaft, and means reachable by the operator when standing at said hand manipulatable shaft operating member for simultaneously operating said clutches, to throw one into, the other out of operating position.

4. In mechanism of the class described, a tiltable ladle, a suspending device therefor, gearing transported by the suspending device for tilting the ladle with reference to the suspending device, a shaft parallel to the tilting axis of the ladle adapted to operate the gearing, additional motor driven

gearing on one portion of said shaft, a hand
manipulatable shaft operating member on
the end of said shaft most remote from the
ladle, an independent clutch mechanism for
5 connecting each of said last mentioned de-
vices in operative working relation with
said shaft, means reachable by the operator
when standing at said hand manipulatable
shaft operating member for simultaneously
10 operating said clutches, to throw one into,

the other out of operating position, and
means detachably securing the clutch op-
erating mechanism in selected position.

In witness whereof, I have hereunto sub-
scribed my name in the presence of two wit- 15
nesses.

JOHN S. TOWNSEND.

Witnesses:

PAUL BIELEFELDT,
OSCAR L. COFFEY.