W. R. JONES.

DEVICE FOR OPERATING THE LADLES IN THE BESSEMER PROCESS.

No. 185,327. Patented Dec. 12, 1876.

Fig. 1.

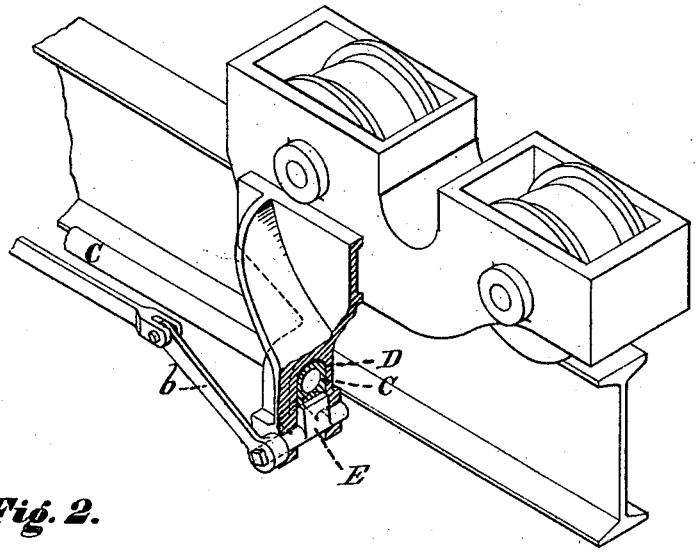


Fig. 2.

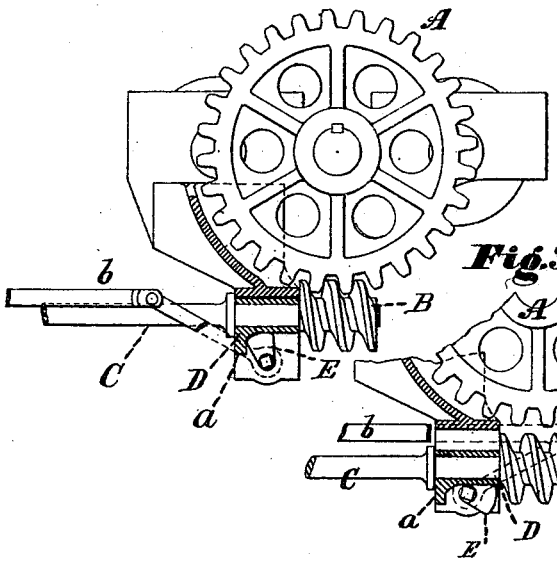


Fig. 3.

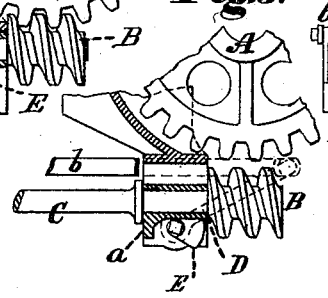
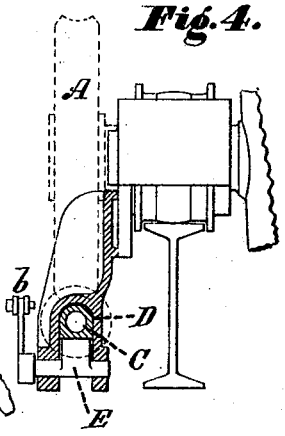


Fig. 4.



Witnesses

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UNITED STATES PATENT OFFICE.

WILLIAM R. JONES, OF BRADDOCK'S FIELD, PENNSYLVANIA.

IMPROVEMENT IN DEVICES FOR OPERATING THE LADLES IN THE BESSEMER PROCESS.

Specification forming part of Letters Patent No. **185,327**, dated December 12, 1876; application filed October 16, 1876.

To all whom it may concern:

Be it known that I, WILLIAM R. JONES, of Braddock's Field, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Devices for Operating the Ladles in the Bessemer Process; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification, in which—

Figure 1 is an isometrical perspective, showing the relation of crane-beam, ladle-carriage, shaft-bearing, worm, shaft, cam, and lever. Fig. 2 is a side elevation, partly sectional, showing the worm geared, with pinion and cam raised and locked. Fig. 3 is a similar view, with cam depressed and pinion free from worm. Fig. 4 is a right-hand end elevation of Fig. 1.

This invention relates to devices for operating the ladles used in the Bessemer process for carrying the metal from the converter to the flasks; and consists in the combination with a spiral-toothed pinion on the shaft of the ladle, of a worm and cam, by means of which latter the worm and pinion can be thrown into connection and then locked tightly, or thrown apart, so that the ladle may be reversed to empty the slag without loss of time.

The means at present in use consist of a spiral-toothed quadrant on the ladle-shaft and a worm controlled by a hand-wheel. The objections to this are: the ladle can be controlled through only a short arc, and when it is to be reversed for cleaning, or other purposes, the workmen are liable in their great hurry, and the tedious operation of turning the worm till the quadrant passes free, to misjudge distances and stop before all the teeth are cleared. Then to tilt the ponderous ladle the crane-hook must be attached to an eye on the bottom of the ladle, and the latter pulled over by the crane. If, as often happens, the teeth of the quadrant are not clear of the worm when the crane pulls, it breaks one or more teeth on the quadrant or threads on the worm, rendering one or both useless until replaced.

To surmount these difficulties I construct on the ladle-shaft a complete pinion, A, with spiral teeth. On the crane-beam I attach a worm, B, on shaft C, which latter extends inwardly to the operator's platform, and is controlled by a hand-wheel, or by steam or water power. Behind the worm the shaft passes through and is journaled in a pillow-block, D, having the shoulder or stop *a*, as in Figs. 2 and 3. Bearing against this block from beneath is a cam, E, operated by a hand-lever, *b*, or system of levers reaching to the operator's stand or not, as desired. The levers also may be operated by hand, steam, or other power. The cam E, when raised, lifts the pillow-block D, and through it throws worm B into connection with pinion A, when, by turning shaft C, the ladle may be tilted through any arc of the circle, and firmly held while in any position.

It is to be observed that when the cam is thus raised to its fullest extent it passes beyond the vertical line of its center and bears against the stop *a*. Any pressure now upon the pillow-block only sets the cam more tightly, and consequently there is no possibility of its working loose.

By lowering the cam E the connection of pinion and worm is at once dissolved, the ladle is free to move instantly in either direction, and no breakage can occur.

The loss by breakage of worms and quadrants on the old plan amounts to a considerable sum annually, as producers know to their cost; hence, with my invention, there is economy in the ultimate cost, economy in time, and a saving in labor, while at the same time a more simple and convenient means is afforded for operating these heavy ladles, and more fully controlling them throughout all their movements.

What I claim as my invention is—

1. In an apparatus for operating ladles, the combination of the cam E, pillow-block D, having the stop *a*, and shaft C, substantially as described.

2. In an apparatus for operating ladles, the combination of pinion A, worm B, shaft C, pillow-block D, cam E, and lever *b*, or system of levers, substantially as set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 2d day of October, 1876.

WILLIAM R. JONES.

Witnesses:

GRANT CURTIS,

WILLIAM WHITE, Jr.