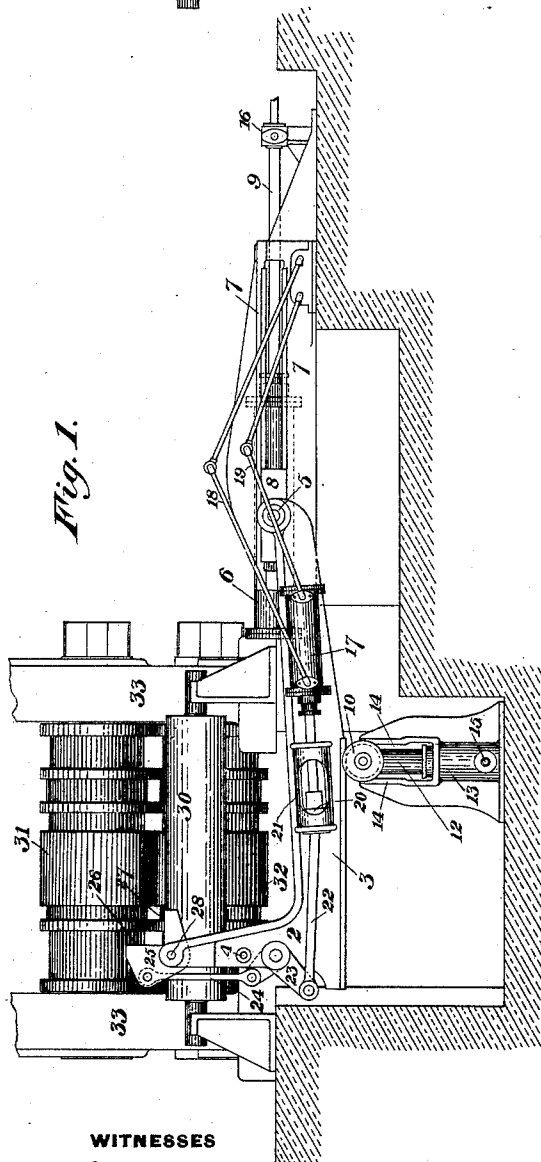
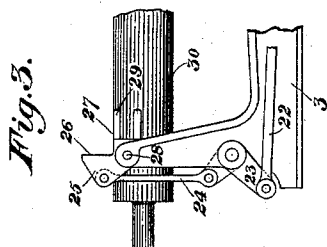


P. N. CUNNINGHAM.
INGOT MANIPULATOR.

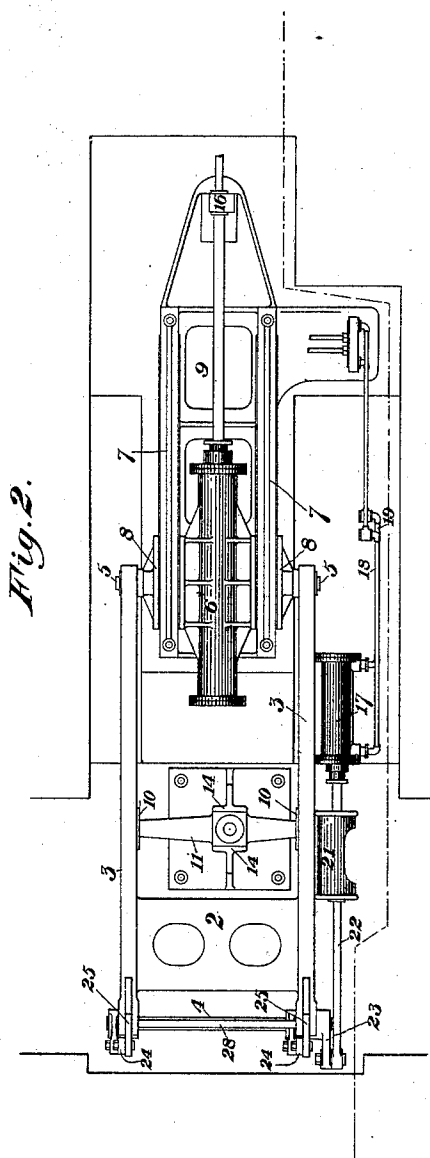
No. 483,644.

Patented Oct. 4, 1892.



WITNESSES

C. Byrnes.
H. McCorum



INVENTOR

Peter N. Cunningham
by H. B. Baskett & Son
his attorneys

(No Model.)

2 Sheets—Sheet 2.

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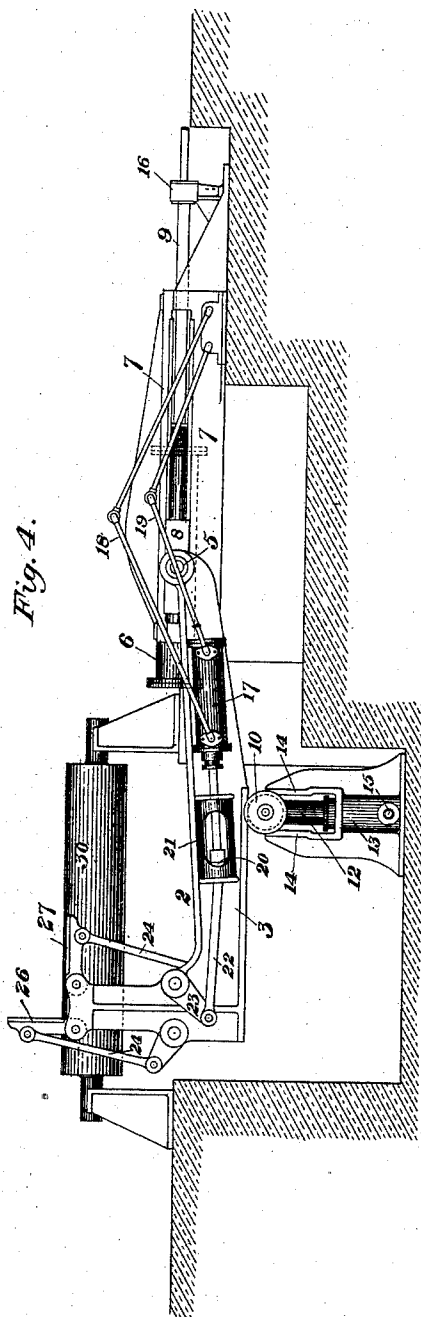


Fig. 4.

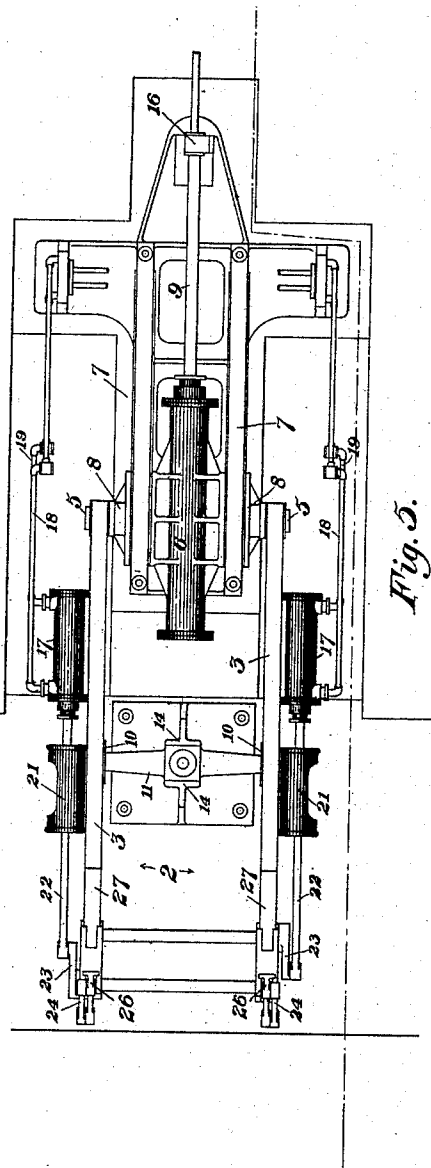


Fig. 5.

WITNESSES

C. Byrnes
H. M. Corwin

INVENTOR

Peter N. Cunningham
by T. R. Baskinwell
his attorney

UNITED STATES PATENT OFFICE.

PETER N. CUNNINGHAM, OF NEW CASTLE, ASSIGNOR OF ONE-HALF TO
ROBERT GRAY, OF PITTSBURG, PENNSYLVANIA.

INGOT-MANIPULATOR.

SPECIFICATION forming part of Letters Patent No. 483,644, dated October 4, 1892.

Application filed September 26, 1891. Serial No. 406,888. (No model.)

To all whom it may concern:

Be it known that I, PETER N. CUNNINGHAM, of New Castle, in the county of Lawrence and State of Pennsylvania, have invented a new and useful Improvement in Ingot-Manipulators, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, in which—

Figure 1 is a side view of my improved ingot-manipulator in position beneath the feed-rolls. Fig. 2 is a top plan view of the same with the feed-rolls removed. Fig. 3 is a detail view of a modification of the pusher. Fig. 4 is a side view of another form of my manipulator, and Fig. 5 is a top plan view of the same.

My invention relates to that class of ingot-manipulators in which finger-bars mounted upon a movable platform are introduced between the feed-rolls to push the ingot side-wise or turn the same over into proper position for the next pass through the rolls; and it consists in improved mechanism for working the finger-bars, as hereinafter described, and set forth in the claims.

In the drawings, 2 indicates the movable platform, consisting of two side pieces 3 3, connected at one end by the cross-piece 4 and pivoted at the other end to shafts 5, extending from the sides of a cylinder 6. This cylinder 6 reciprocates between guideways 7, brackets 8 being provided on each side of the cylinder, in grooves upon the upper and lower faces of which brackets the guideways fit. Each bracket carries at its outer end the shaft 5. The piston-rod 9 and piston of this cylinder are stationary, the piston-rod being secured at 16, and motive fluid is supplied either through jointed pipes or through the piston-rod itself to cause the cylinder to move back and forth upon the piston and between the guideways. Each side piece 3 of the platform rests upon a roller 10, carried at the end of a horizontal shaft 11, and at its center this shaft 11 is mounted upon a plunger 12, which reciprocates vertically within a cylinder 13, the middle portion of the shaft be-

ing squared and moving between guideways 14, as shown in Figs. 2 and 5. A supply-pipe 15 enters the lower end of cylinder 13 and causes the plunger to reciprocate therein.

In the form of Fig. 1 a single cylinder 17 is carried upon one side of the platform 2, being connected by jointed pipes 18 and 19 with a suitable fluid-supply. To the piston-rod of this cylinder is secured a cross-head 20, moving in a covered guideway 21, and to the cross-head is pivoted a connecting-rod 22, which at the other end is pivoted to a bell-crank lever 23, to which is pivoted a link 24, extending therefrom to the finger 25. The finger or pusher of Fig. 1 is in the form of a plate having an angled portion cut therefrom, leaving two sides 26 and 27, which fit against the ingot. This pusher is pivoted at 28 and is moved into its various positions by means of the bell-crank lever and connections, a pusher being provided at each side of the platform, as shown in Fig. 2.

In the form of Fig. 3 the lower part of the pusher consists of two parallel lugs 29, which may be moved so as to inclose the slab or ingot and turn it into proper position for the next pass through the rolls.

In the modification of Figs. 4 and 5 two cylinders 17 are provided, one upon each side of the platform, while the pusher consists of two independent fingers 26 and 27, pivoted to the upright finger-bar, one finger being worked by each cylinder through suitable bell-crank and link connections, as shown. In all the figures 30 represents the feed-roll, while in Fig. 1, 31 and 32 are the rolls, mounted in housings 33.

The advantages of my construction result from the perfect control had over the ingot by reason of the pivoted fingers mounted upon the vertically and longitudinally movable platform and also from the simplicity and small number of parts of the device.

It will be understood that the platform may be attached to a cross-head upon a moving piston-rod instead of reciprocating the cylinder, as shown, that other means for supplying fluid to the cylinders 17 may be employed,

and many other modifications will suggest themselves to those skilled in the art without departing from my invention.

What I claim is—

- 5 1. An ingot-manipulator comprising a movable platform, pivoted pushers mounted thereon and arranged to engage at least two sides of the ingot, and means for turning said pushers, substantially as and for the purposes described.
- 10 2. An ingot-manipulator comprising a movable platform, upright finger-bars rigidly connected thereto, fingers pivotally mounted upon the finger-bars and arranged to engage
- 15 at least two sides of the ingot, and means for turning the fingers, substantially as and for the purposes described.
- 20 3. An ingot-manipulator comprising a vertically and longitudinally movable platform, pivoted pushers mounted thereon, and means for turning said pushers upon their pivots, substantially as and for the purposes described.
- 25 4. An ingot-manipulator comprising a vertically and longitudinally movable platform, pushers pivotally mounted thereon, a cylinder carried by the platform, and connections

between said cylinder and pushers for actuating the same, substantially as and for the purposes described.

- 30 5. An ingot-manipulator comprising a platform carried by a vertically-reciprocating plunger, means for moving said platform longitudinally thereon, pushers pivoted to the platform, a cylinder carried thereon, and connections between said cylinder and the pushers for actuating the same, substantially as and for the purposes described.

- 40 6. An ingot-manipulator comprising a platform carried by a vertically-reciprocating plunger, a separate cylinder reciprocating over a fixed piston-rod and pivotally connected with the platform, pushers pivotally mounted upon the platform, and motive cylinders also mounted thereon and arranged to
- 45 actuate said pushers, substantially as and for the purposes described.

In testimony whereof I have hereunto set my hand this 24th day of September, A. D. 1891.

PETER N. CUNNINGHAM.

Witnesses:

C. BYRNES,

H. M. CORWIN.