

(No Model.)

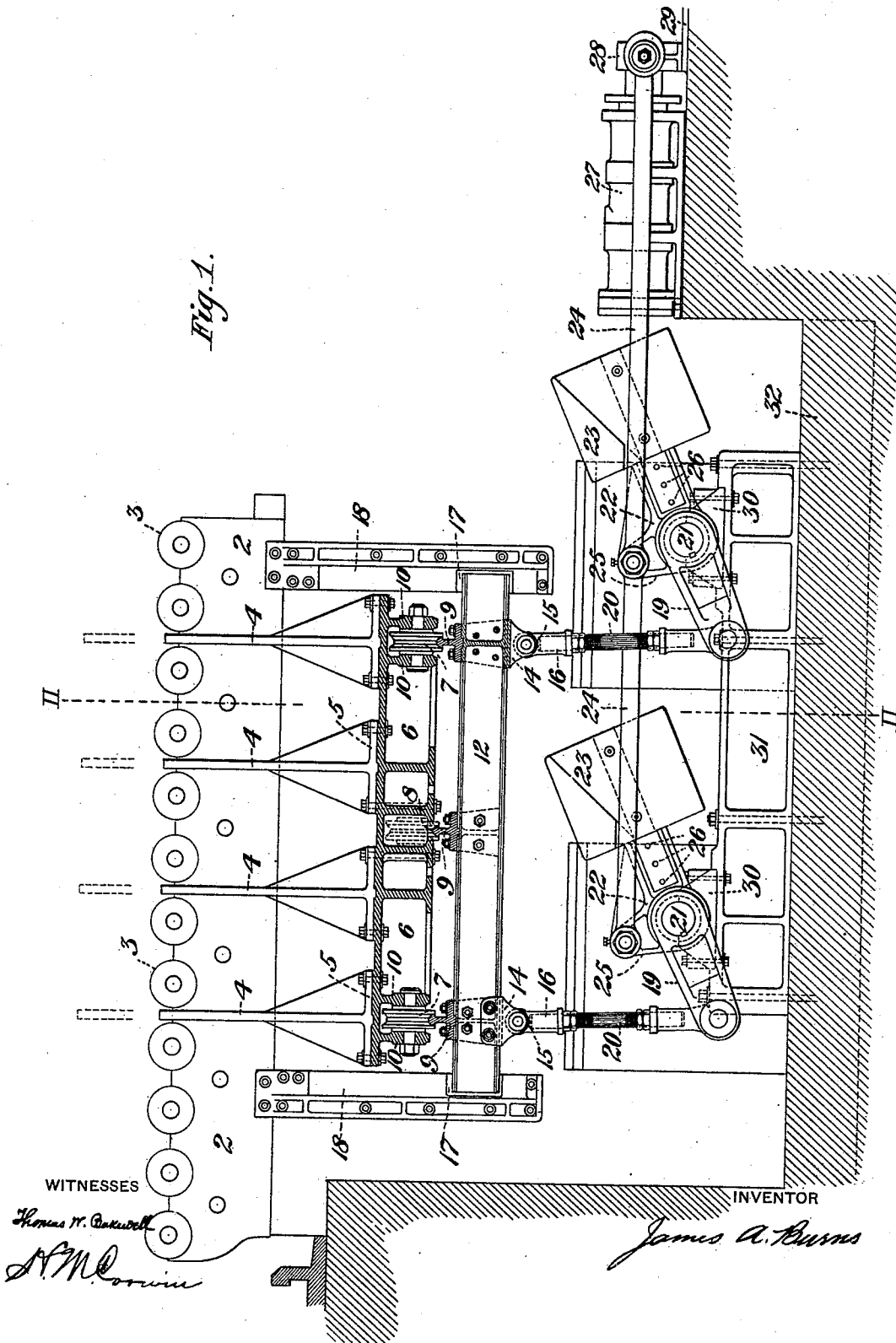
2 Sheets—Sheet 1.

J. A. BURNS.
INGOT MANIPULATOR.

No. 464,708.

Patented Dec. 8, 1891.

Fig. 1.



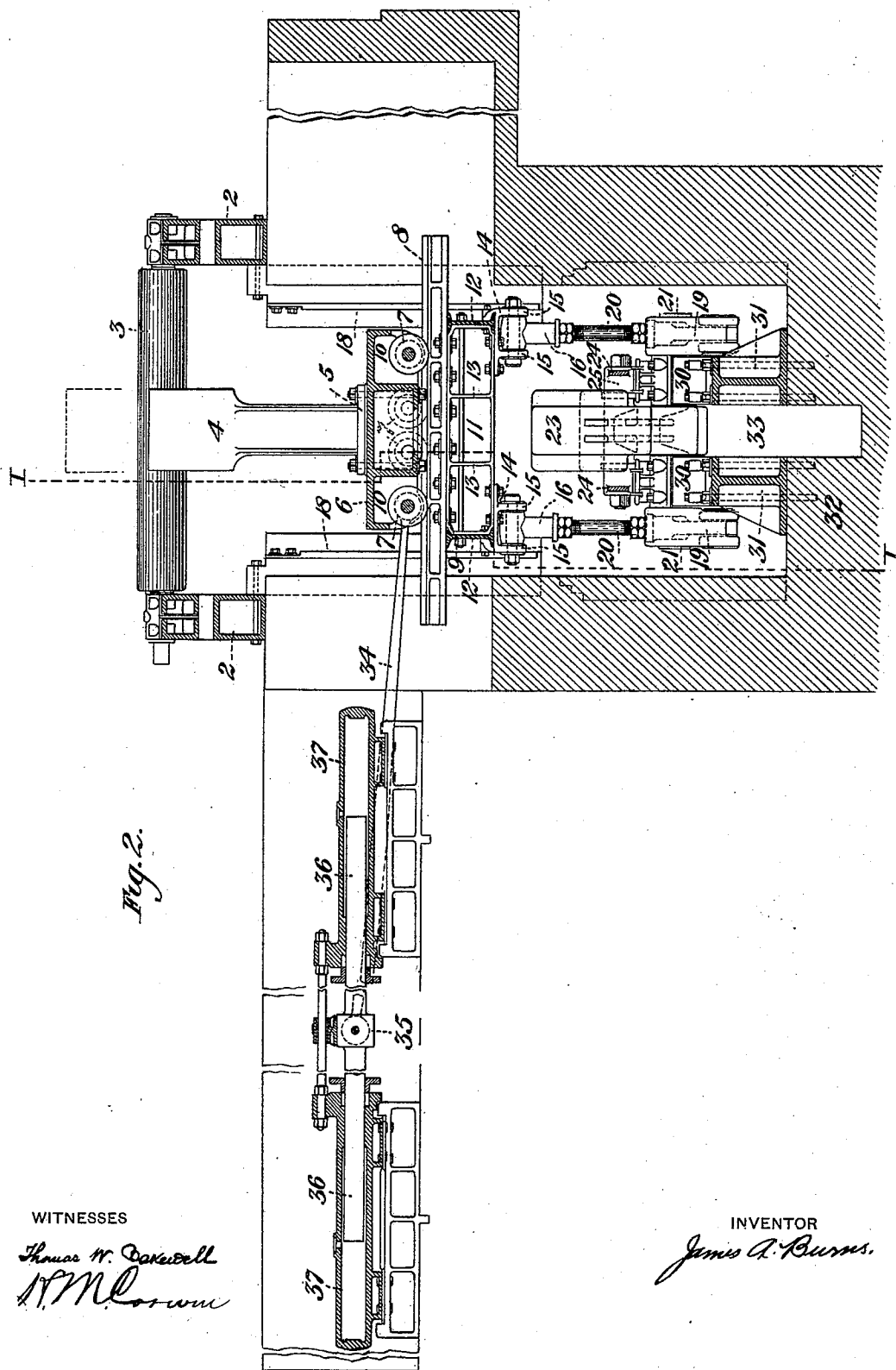
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WITNESSES

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INGOT-MANIPULATOR.

SPECIFICATION forming part of Letters Patent No. 464,708, dated December 8, 1891.

Application filed April 24, 1891. Serial No. 390,254. (No model.)

To all whom it may concern:

Be it known that I, JAMES A. BURNS, of Homestead, in the county of Allegheny 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, forming part of this specification, in which—

10 Figure 1 shows a longitudinal section of my improved manipulator on the line I I of Fig. 2, and Fig. 2 is a transverse section on the line II II of Fig. 1.

15 Like symbols of reference indicate like parts in each.

In the drawings, 2 represents the frame of the feed-table of a rolling-mill, which table, as usual, is provided with a series of feed-rollers 3.

20 The ingot-manipulator consists of a series of upright push-bars 4, the upper ends of which are arranged between the rollers of the feed-table, while their lower ends are bolted by means of flanges 5 to a traveling truck 6. 25 This truck is supported upon wheels 7, which move upon rails 9, and the truck is reciprocated by means of the connecting-rod 34, of which one end loosely encircles the shaft of the wheels 7, while the other is pivoted to the 30 cross-head 35. To this cross-head are rigidly connected the plungers 36 of a pair of single-acting hydraulic cylinders 37, by means of which the table is actuated in either direction. The wheels 7 are trunnioned in downwardly- 35 projecting flanges 10, which also serve to stiffen the truck and prevent any sagging of the same between the supporting-wheels. The rails 9 are supported by and bolted to a vertically-reciprocating platform 11, built up of the I-beams 40 12 and the casting 13, bolted between them. These I-beams extend longitudinally beyond the ends of the platform and are provided thereat with plates 17, which move in the guideways 18, bolted to the frame-work, as shown in 45 Fig. 2, and serve to guide the platform in its rising and falling movements.

Bolted at the four corners of the platform 11 are the castings 14, having trunnioned in their downwardly-projecting flanges 15 the 50 connecting-rods 16. These rods 16 are adjustable in length by the screw-threaded connections 20, and at their lower ends are pivoted

to the cranks 19. The cranks 19 are keyed to shafts 21, there being two cranks upon each shaft. Between the cranks upon said shafts 55 are keyed the bell-crank levers 22, having counter-weights 23. The arms 38 are forked, as shown in Fig. 2, and the weights 23 are adjusted thereon by interchanging the supporting-bolts in the holes 26 of such arm. 60

The connecting-rods 24, of which there are two in number, pass on each side of a hydraulic cylinder 27, and are pivoted to a cross-head 28, actuated by such cylinder and moving on a guideway 29. The shafts 21 are suitably 65 supported in bearings 30, bolted to a bed-plate 31, which in turn rests upon and is bolted to the foundation 32. The bed-plate 31 is provided with a longitudinal opening 33 to allow for the passage of the lower portion of one of 70 the counter-weights 23.

The operation is as follows: The bars 4 being in their lowermost position, as shown in the drawings, and an ingot lying upon the feed-rollers at one side of said bars, motive 75 fluid is admitted to the cylinder 27, actuating the rods 16 and the platform 11, and raising the push-bars 4 upon the truck 6 to the position shown by dotted lines in the figures. Motive fluid being then admitted to one of the 80 cylinders 37 moves the push-bars laterally and shoves the ingot to the proper place, when it is again carried forward by the feed-rollers. If it is desired to turn the ingot as well as move it, the push-bars 4 are adjusted by the cylinders 37 so as to engage one edge of the ingot 85 as they rise, and thus turn it to its next side. In former devices of a similar nature whenever a heavy ingot lay at one side of the feed-table, in order to turn the same 90 over, the truck was moved to the ends of the rails 9, and when the push-bars were lifted, it produced a canting of the platform bearing the rails 8, together with its supports, which canting caused the parts to bind upon each 95 other. A like effect was produced whenever the truck was moved from one end of the rails to the opposite end. This canting effect is entirely obviated in my device, since the platform is supported at its four corners by 100 the rods 16, and hence if any unusual weight bears upon one corner of the platform the strain is immediately communicated by the shafts 21 and the connecting-rods 24 to the

other parts, and canting of the platform is absolutely prevented.

The advantages of the mechanism are obvious, since the entire mechanism moves easily and smoothly, there being no binding of the parts, and by means of the hydraulic cylinder the motion of the parts is under the complete control of the operator.

The essential feature of my invention lies in supporting the part which carries the push-bars at several points to equalize the lifting motion and to prevent binding. The other parts of the apparatus I do not claim, and I therefore do not wish to limit myself to the exact form of platform, truck, and connections shown; but

What I claim is—

1. In an ingot-manipulator, the combination of a vertically-movable platform, guideways between which the platform moves, push-bars movably mounted thereon, means for moving the push-bars laterally independently of the platform, rods pivoted to the platform, and a motor arranged to vertically reciprocate said rods and platform, substantially as and for the purposes described.

2. In an ingot-manipulator, the combination of a vertically-movable platform, guideways between which the platform moves, links pivoted to the platform at different points and connected to cranks, and bell-crank levers on the crank-shafts, movable push-bars mounted

upon the platform, means for rotating the crank-shafts, and means for moving the push-bars laterally independently of the platform, substantially as and for the purposes described.

3. In an ingot-manipulator, the combination of a vertically-movable platform having independently-movable push-bars mounted thereon, guideways between which the platform moves, supports pivoted to the four corners of the platform, and motors arranged to actuate the push-bars and supports, substantially as and for the purposes described.

4. In an ingot-manipulator, the combination of a vertically-movable platform, guideways between which the platform moves, links pivoted to the platform at different points and connected to cranks, bell-crank levers on the crank-shafts, counter-weights connected to said crank-shafts, movable push-bars mounted upon the platform, means for rotating the crank-shafts, and means for moving the push-bars laterally independently of the platform, substantially as and for the purposes described.

In testimony whereof I have hereunto set my hand this 23d day of April, A. D. 1891.

JAMES A. BURNS.

Witnesses:

W. C. MILLER,
JOS. R. ALTMAN.