(No Model.) 2 Sheets—Sheet 1.

J. F. LUNDAHL.

CHARGING MACHINE FOR FURNACES.

No. 479,437. Patented July 26, 1892.

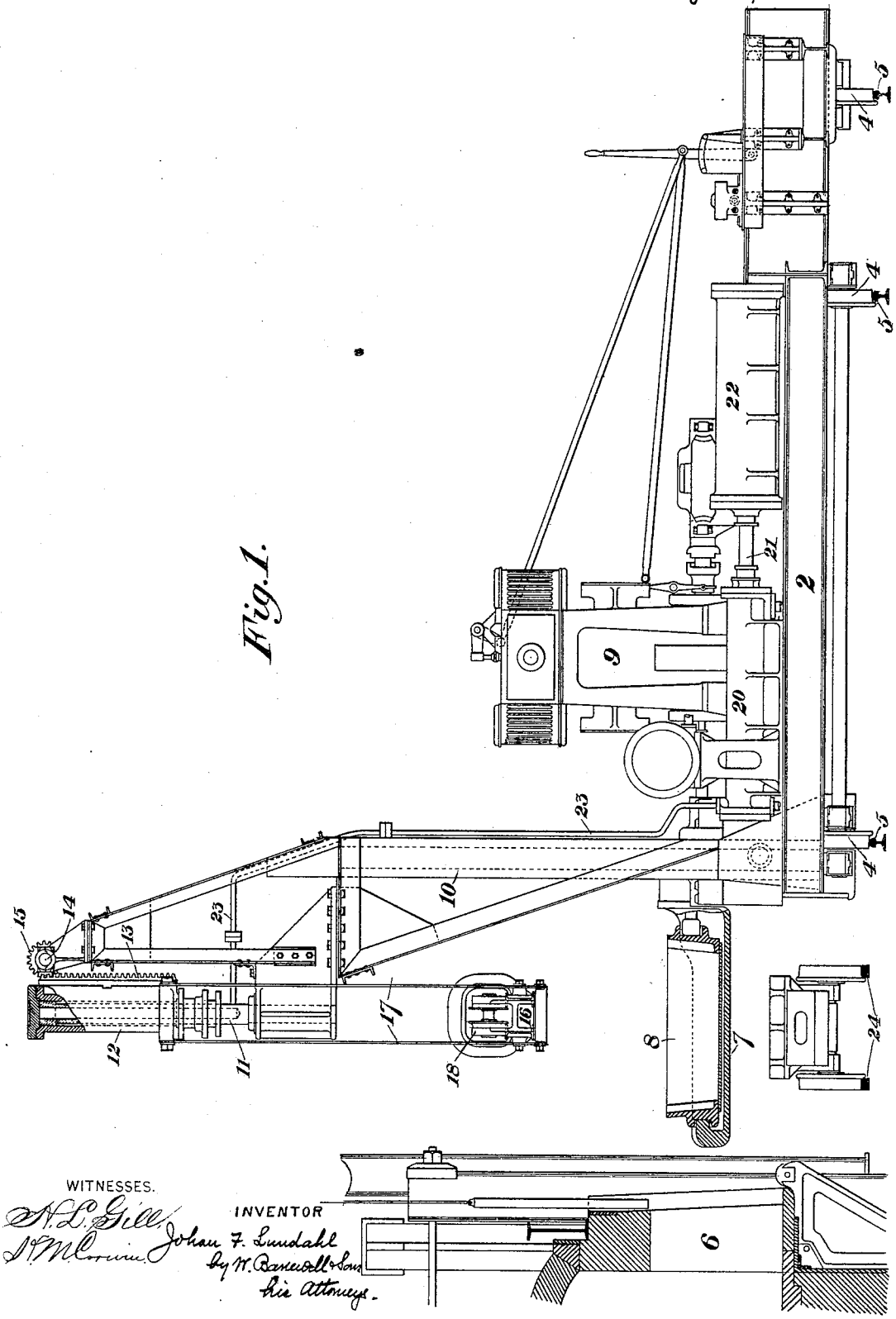

Fig. 1.

WITNESSES.

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(No Model.)

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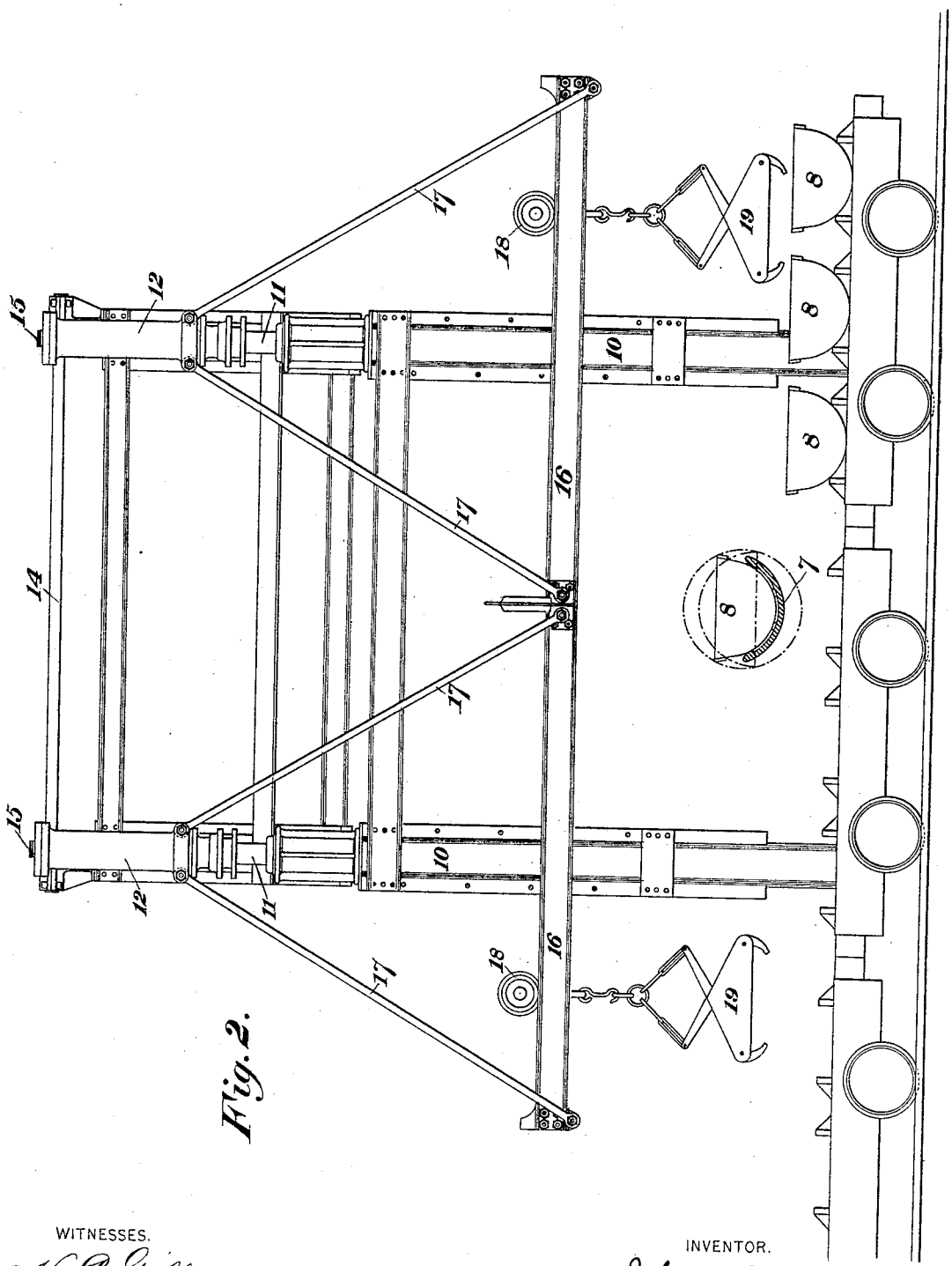

WITNESSES.

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UNITED STATES PATENT OFFICE.

JOHAN FRITHIOF LUNDAHL, OF HOMESTEAD, PENNSYLVANIA.

CHARGING-MACHINE FOR FURNACES.

SPECIFICATION forming part of Letters Patent No. 479,437, dated July 26, 1892.

Application filed September 17, 1891. Serial No. 405,956. (No model.)

To all whom it may concern:

Be it known that I, JOHAN FRITHIOF LUNDAHL, of Homestead, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Charging-Machines for Furnaces, of which the following is a full, clear, and exact description

The object of my invention is to provide means for charging furnaces—such as open-hearth furnaces—with their stock of metal, &c., and it is illustrated in the accompanying drawings, in which—

Figure 1 shows the apparatus in side elevation, partly in vertical central section. Fig. 2 is a partial front view of the apparatus.

Referring to the drawings, 2 represents the carriage or frame of the apparatus. It comprises trucks whose wheels 4 are mounted on rails 5, so that the carriage may be moved laterally in front of the doors of a series of open-hearth furnaces 6. The carriage is provided with a cradle or box support 7, adapted to receive and hold a box 8, which contains the furnace-charge, and to be projected by suitable means, so as to advance the box within the door of the furnace, and when in such position to upturn the same and to distribute the charge upon the hearth.

The mechanism by which the box-support is projected and rotated may be substantially the same in construction as illustrated in the prior patent of P. T. Berg, No. 432,593, dated July 22, 1890, the description of which need not now be repeated.

9 is a steam-engine, which is mounted on the carriage 2 and is mechanically connected with the driving-wheels thereof, so that on operating the engine the carriage is caused to traverse in front of the furnaces, as above described. Supported at the front end of the carriage 2 is an upright structure or frame composed of posts 10, on which are fixed upright stationary plungers 11. Hydraulic cylinders 12 are set in suitable vertical slideways on this frame and are set on the plungers, so that on admission of water to the cylinders they can be caused to move vertically on the plungers. In order to insure uniformity of action of these cylinders, I provide them with racks 13, in gear with gear-wheels 15 on a connecting cross-shaft 14.

16 is a track or platform, which is suspended by struts 17 from the movable cylinders 12, and 18 are trolley-wheels mounted on the platform 16 so as to be movable longitudinally thereon and carrying tongs 19, adapted to grasp charging-boxes and to remove them from or deliver them to the box-support 7.

In order to operate the cylinders 12, I employ a water-forcing cylinder 20, whose plunger 21 is actuated by a suitable steam-cylinder 22. On operating the cylinder 22, so as to project its plunger, water is forced from the cylinder 20 through the pipe 23 into the cylinders 12, so as to elevate the latter, together with the frame 16 and the trolley and tongs carried thereby. On reversing the cylinder 22 the water is exhausted from the cylinders 12, which thereupon descend by gravity.

Between the front of the carriage 2 and the line of furnaces is a track 24, on which are mounted cars for carrying the charging-boxes 8 into position in front of the furnaces.

The operation is as follows: In order to charge a furnace, the carriage 2 is moved so as to bring the box-support opposite to the furnace-door. The cylinders 12 are then dropped, so as to lower the tongs 19 into such position that one of them can seize a box. The cylinders 12 are then raised, so as to lift the platform 16 and to raise the box from the car. The trolley is then moved along the platform, so as to bring the box directly above the box-support, and the platform is lowered to deposit the box within the same. The tongs are then released and may be moved back to grasp another box, and after the box has been introduced into the furnace, discharged, and withdrawn the other tongs may be moved up to seize and remove the empty box. By means of this apparatus I am enabled to perform the work of charging the furnace very rapidly and with little manual labor.

Without limiting myself to the precise construction herein described and shown, I claim—

1. In a charging apparatus for furnaces, the combination of a carrier movable in front of the furnace or furnaces, a box-support carried thereby, means for feeding the box-support forward, a platform mounted on the carrier and extending longitudinally in front of the furnace or furnaces, means for moving the platform vertically, and carrying devices

mounted on the platform and adapted to deliver the charge to the box-support, substantially as and for the purposes described.

2. In charging apparatus for furnaces, the combination of a carrier movable in front of the furnace or furnaces, a box-support carried thereby, means for feeding the box-support forward, a lifting-cylinder and plunger mounted on the carrier, and carrying devices upheld above the box-support by the cylinder and plunger and extending substantially parallel with the furnace or furnaces, substantially as and for the purposes described.

3. In charging apparatus for furnaces, the combination of a carrier movable in front of the furnace or furnaces, a box-support carried thereby, means for feeding the box-support forward, a platform mounted on an upright frame on the carrier and extending longitudinally of the furnace or furnaces, means for moving the platform vertically, and carrying devices mounted on the platform and adapted to deliver the charge to the box-support, substantially as and for the purposes described.

4. In charging apparatus for furnaces, the combination of a carrier movable in front of the furnace or furnaces, a box-support carried thereby, means for feeding the box-support forward, motors, comprising cylinders and plungers, upheld by the carrier, supporting devices connected with said motors and movable vertically thereby, and gearing connecting the movable elements of the motors and causing them to move in unison, substantially as and for the purposes described.

5. In charging apparatus for furnaces, the combination of a carrier movable in front of the furnace or furnaces, a box-support carried thereby, means for feeding the box-support forward, a platform mounted on the carrier, means for moving the platform vertically, and carrying devices suspended from trolleys which are mounted on and are movable on the platform above the box-support, substantially as and for the purposes described.

In testimony whereof I have hereunto set my hand this 15th day of September, A. D. 1891.

JOHAN FRITHIOF LUNDAHL.

Witnesses:

W. H. CORBETT,

H. H. HERVEY.