

(No Model.)

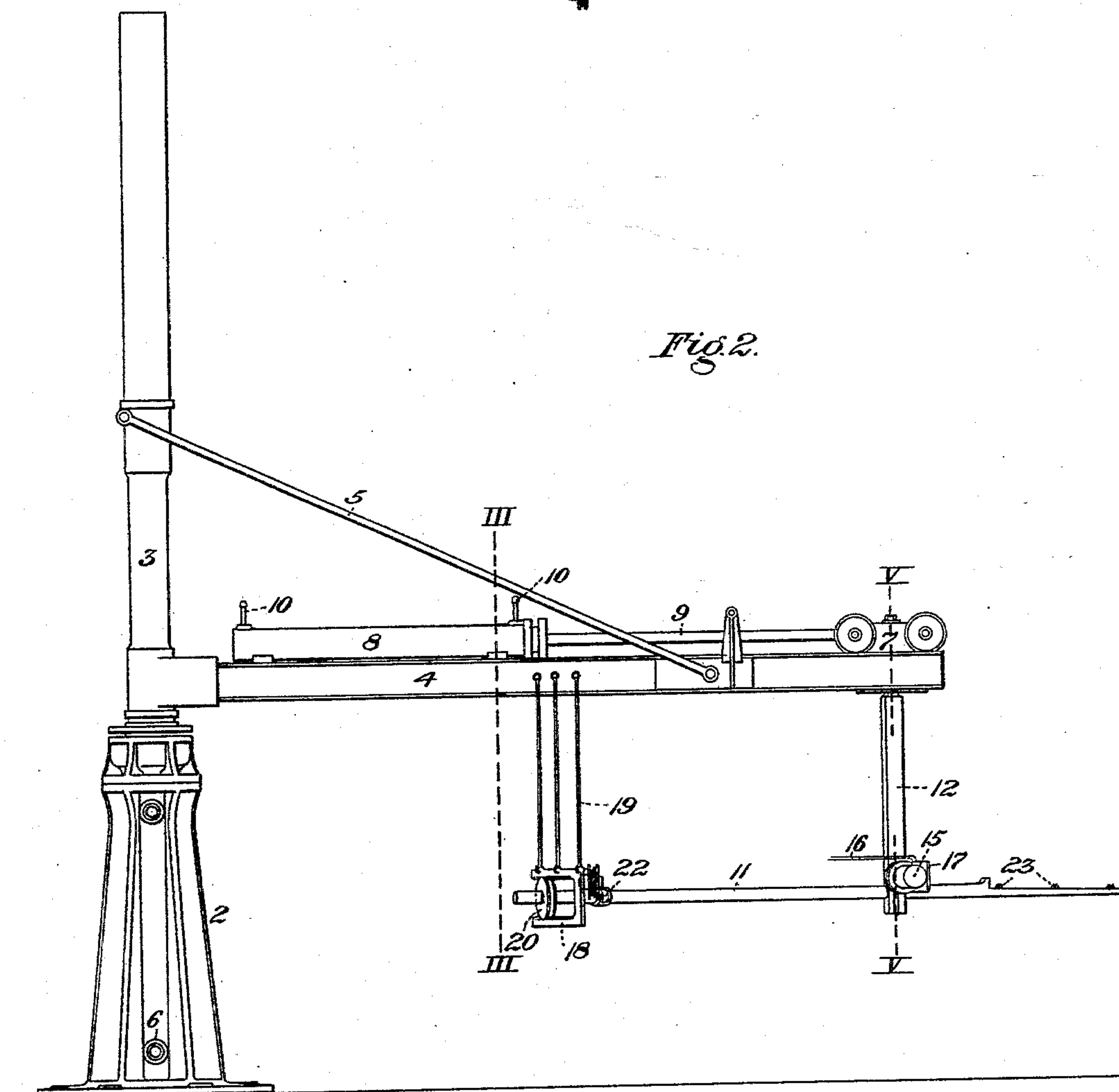
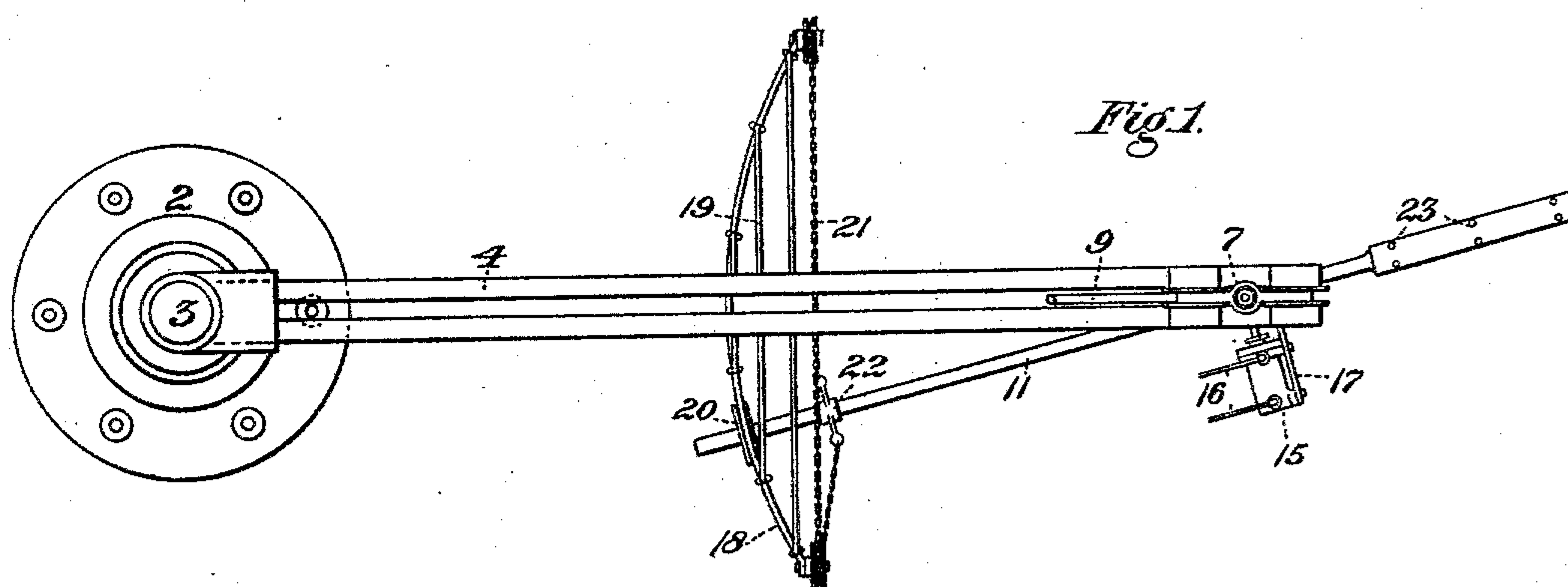
2 Sheets—Sheet 1.

J. W. ANDERSON.

APPARATUS FOR CHARGING INGOTS, &c., INTO FURNACES.

No. 414,478.

Patented Nov. 5, 1889.



WITNESSES.

C. M. Clarke
Thomas W. Baxwell

INVENTOR.

John W. Anderson

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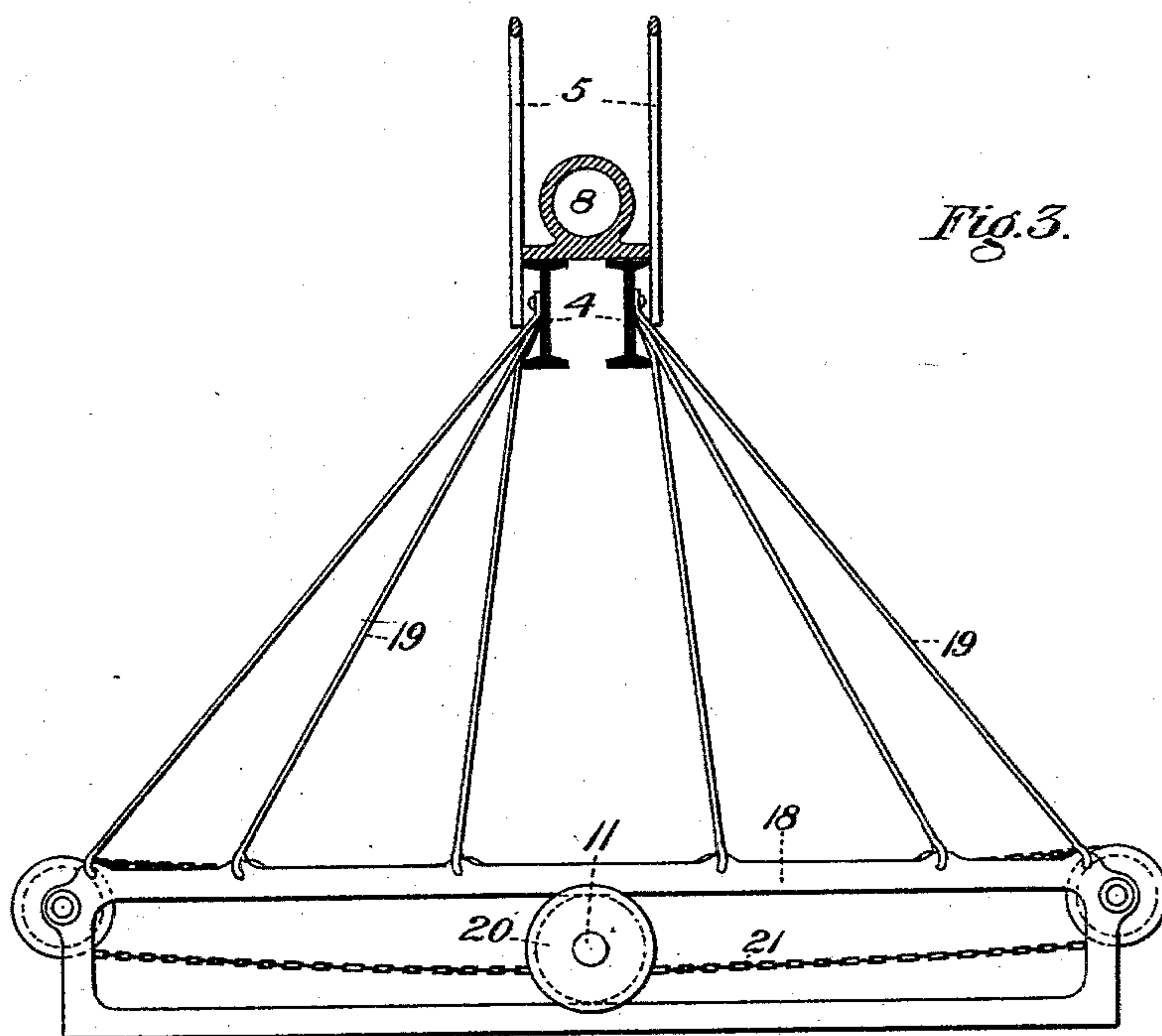


Fig. 3.

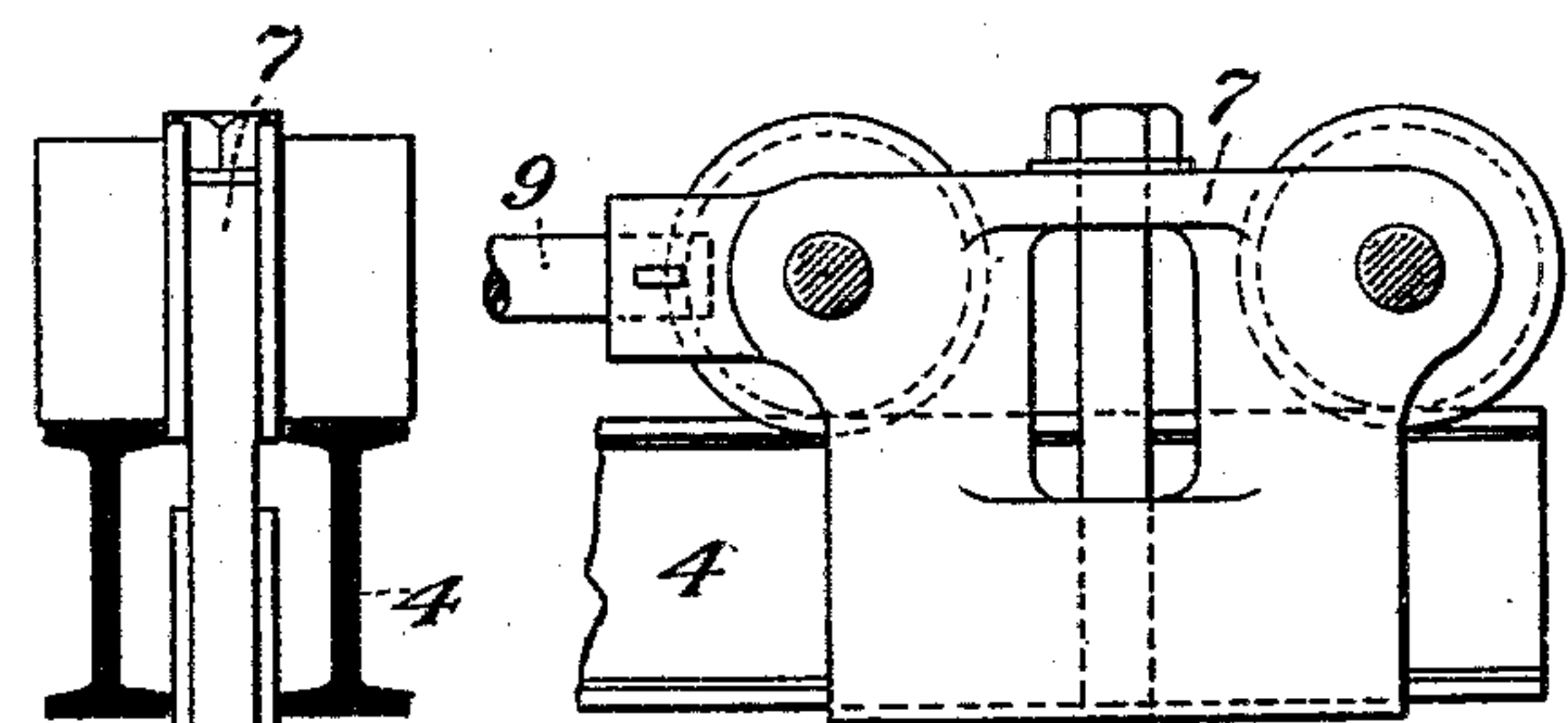


Fig. 4.

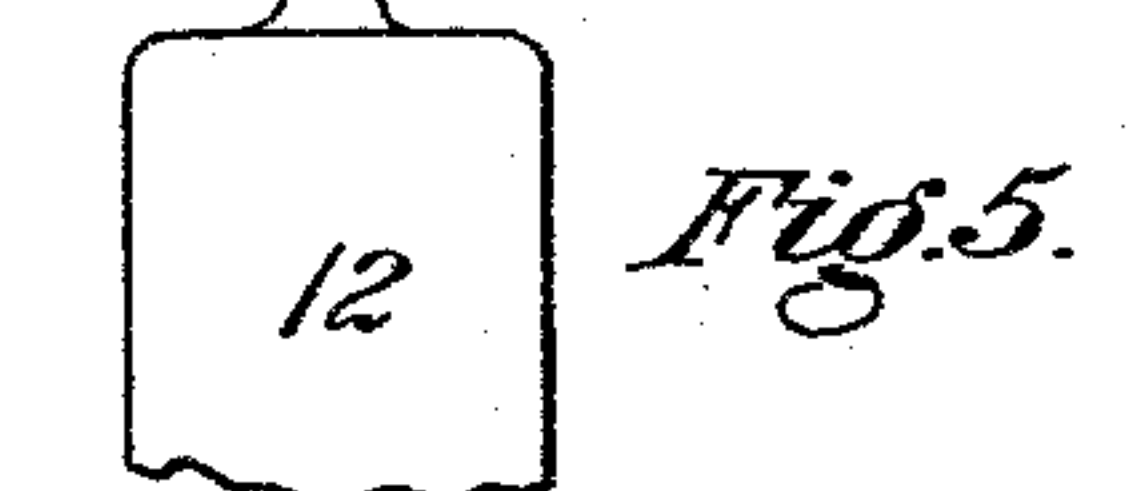
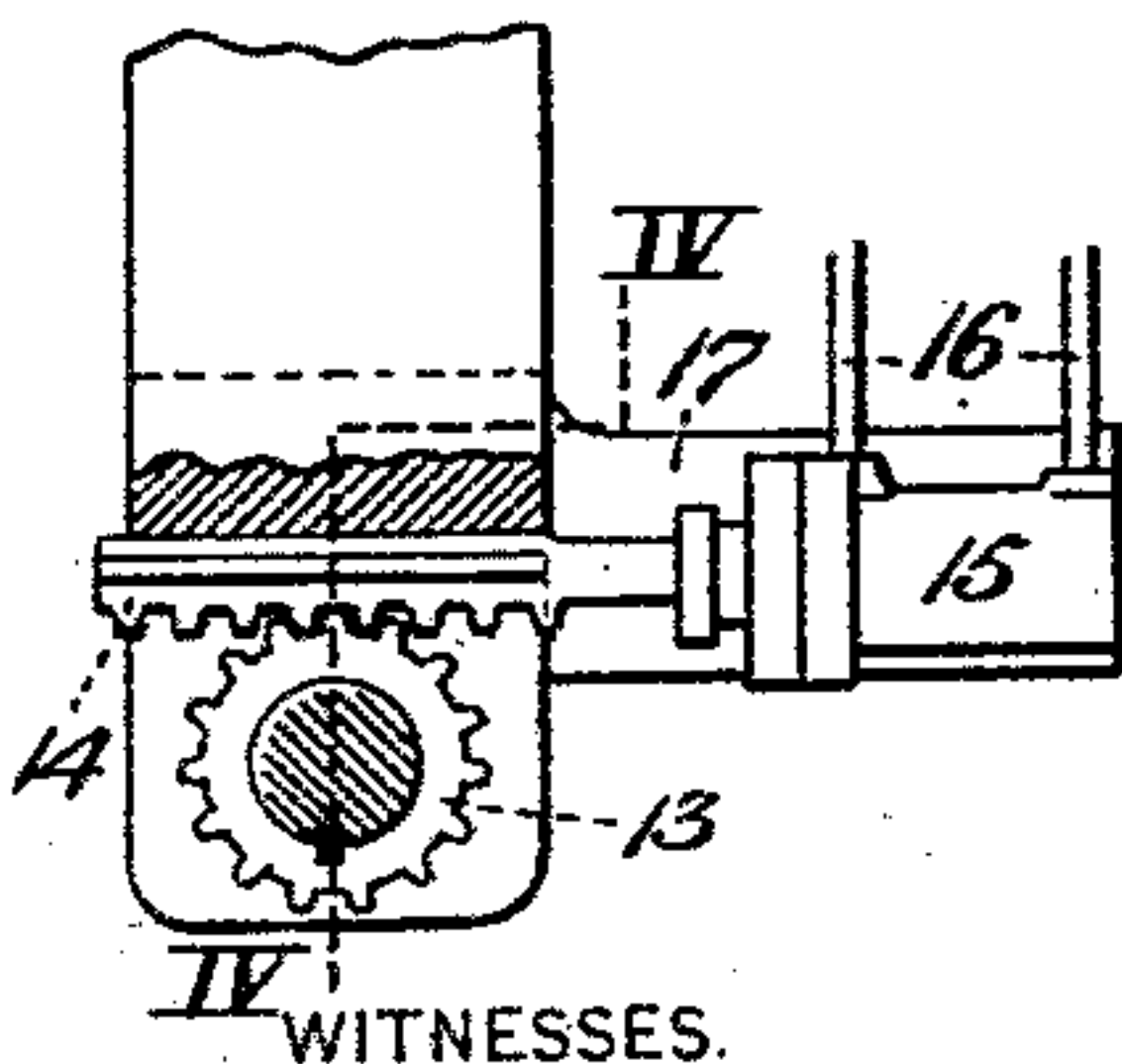
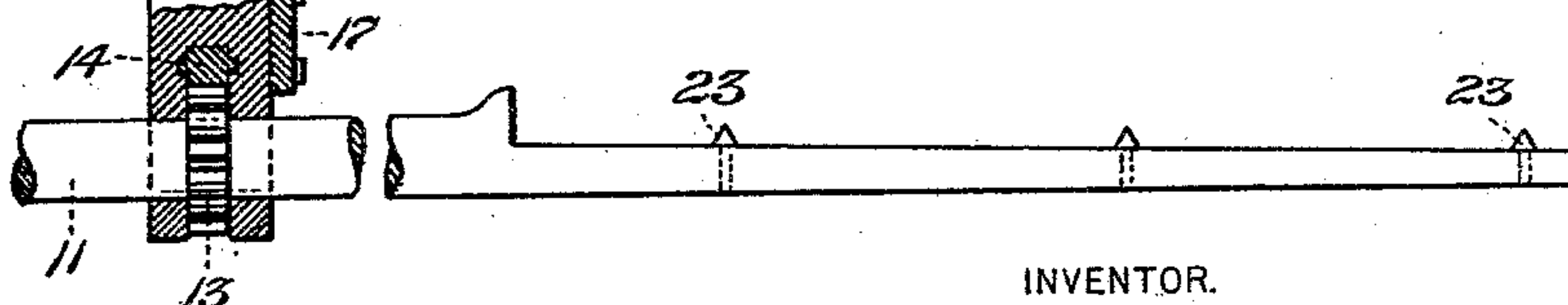


Fig. 5.



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UNITED STATES PATENT OFFICE.

JOHN W. ANDERSON, OF ALLEGHENY, PENNSYLVANIA.

APPARATUS FOR CHARGING INGOTS, &c., INTO FURNACES.

SPECIFICATION forming part of Letters Patent No. 414,478, dated November 5, 1889.

Application filed September 4, 1889. Serial No. 322,912. (No model.)

To all whom it may concern:

Be it known that I, JOHN W. ANDERSON, of Allegheny, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Apparatus for Charging Ingots, &c., into Furnaces, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, in which—

Figure 1 is a plan view of my improved charging-crane. Fig. 2 is a side elevation thereof. Fig. 3 is a vertical section on the line III III of Fig. 2. Fig. 4 is a side elevation of the trolley and peel or ingot supporting device, shown partly in section on the line IV IV of Fig. 5. Fig. 5 is a vertical cross-section on the line V V of Fig. 2.

Like symbols of reference indicate like parts in each.

The object of my invention is to provide a device for charging heating-furnaces and similar metallurgical furnaces with ingots or blooms of metal. The nature of the work which it performs and the manner of its construction are indicated in the following description.

In the drawings, 2 represents the upright cylinder of a crane. 3 is a plunger and mast, the lower part of which fits within the cylinder and is rotary therein; and 4 is the projecting jib, consisting of metal beams attached at one end to the mast and suitably braced by diagonal struts 5.

The cylinder 2 is provided with the usual water-inlet 6, supplying motive fluid by which the plunger may be moved vertically in the cylinder.

The parts which I have described are of a construction well known in the art and may be replaced by other similarly-acting devices of different forms. The mast is rotary within the cylinder, so that the jib of the crane is capable of a radial motion around the axis of the mast.

7 is a trolley, which is mounted on the jib and is longitudinally movable thereon. To effect this longitudinal motion, I may use any suitable power devices; but I prefer to employ a racking-cylinder 8, mounted on the jib, and having its plunger 9 connected with the trolley. This cylinder is provided with

suitable inlet-pipes 10 at both ends for the purpose of supplying motive fluid, by means of which the plunger can be moved lengthwise in either direction to advance or retract the trolley. The peel or ingot supporting device 11 is suspended from the trolley by means of a vertical bar or frame 12, whose upper end is connected by a swivel-joint with the frame of the trolley, as shown in Fig. 4, so that the bar is capable of rotation on its vertical axis. The shaft of the peel passes through a transverse hole at the lower end of the bar 12, and has affixed to it a gear-wheel 13, which is fitted within a cavity at the end of the bar. A rack-bar 14 also extends through this cavity, and is provided with teeth in gear with the peripheral teeth on the wheel 13. The rack-bar is attached to or forms part of the plunger of a hydraulic cylinder 15, mounted on a suitable bracket 17, projecting from the peel-supporting bar 12, and provided with fluid-inlet pipes 16 at its ends, by means of which the rack-bar can be moved lengthwise in either direction. Such motion of the rack-bar will rotate the gear-wheel 13, and will consequently produce a rotation of the peel-shaft on the longitudinal axis of the latter. The peel-shaft is thus capable of three distinct motions, viz: a back-and-forth motion with the trolley 7 in the travel of the latter along the jib, a radial sweep on the axis of the supporting-bar 12, and a rotary motion on its own longitudinal axis.

For the purpose of supporting the peel-shaft at more than one point, so as to afford the necessary rigidity of action thereof, I provide a track or supporting-frame 18, which is suspended by rods 19 from the jib, and is formed in the arc of a circle whose center is in the axis of the upright bar 12. This track consists, preferably, of two parallel bars set one above the other and connected rigidly at their ends. A grooved wheel 20 is set between the bars of this track, so as to be capable of traveling therein, and the shaft of the peel passes loosely through a hole in the center of the wheel. The radial sweep of the peel is obtained by any suitable mechanism, preferably by a chain 21, which passes around pulleys on the circular track 18, and at its ends is connected to a collar 22 on the peel-shaft.

By drawing on this chain in one direction or the other the peel-shaft may be moved in a radial direction on the axis of the bar 12, which turns with it in its swivel-connection with the trolley, the wheel 20 at the same time traveling on its track, so as to support the peel-shaft in any position. By reason of the fact that the peel-shaft passes loosely through the wheel 20 said wheel opposes no resistance to the longitudinal motion of the peel with the trolley, but will adjust itself on the track to conform to the variations in angle of the peel-shaft caused by such longitudinal motion.

The front end of the peel may be formed in any manner suitable to support an ingot or bloom of metal; but I prefer to make it in the form of a flat plate or spade, which may be provided on its surface with spikes 23 to prevent slipping of the ingot or bloom.

The operation of my improved charging-crane is as follows: When it is desired to place an ingot or bloom in the heating-furnace, such metal piece is placed on the peel by any suitable means. The jib of the crane is turned by rotating the mast, so as to direct the end of the jib toward the furnace-door, and by means of the racking-cylinder the trolley is projected on the jib so as to advance the end of the peel (which is supported and carried thereby) into the furnace. The metal piece may then be carried laterally within the furnace to any position on either side of the door by swinging the peel-shaft on its vertical axis 12 in the manner before explained. When in proper position over the furnace-hearth, the metal piece may be removed from the peel by any suitable means; but I prefer to employ the peel itself in turning over the metal and setting it on its edge on the hearth instead of placing it flat on its side thereon, since by setting the metal on its edge it is thoroughly exposed to the heating action of the furnace, whereas if it is set on its side a large part of the metal lying on the hearth is excluded from the flame and the metal is imperfectly heated; besides, by setting the pieces on the edges less room is taken up and I am enabled to place a large number of them in the furnace. To effect this tipping of the metal piece from the peel so as to place it on its edge, I simply rotate the peel on its longitudinal axis by means of the cylinder 15 and rack 14. This rotation of the peel turns the peel-plate or spade into a vertical position, thus giving a quarter-turn to the metal piece and setting it on its edge on the hearth.

The advantages of my invention will be appreciated by those skilled in the art.

The crane is simple in its construction, is easy to operate, and is a means of saving of time and labor in the operation of heating the metal. It is also of advantage because in its use the heating-furnaces are not necessarily arranged in the arc of the circle around the center of the crane-mast, as is the case

with the charging-crane commonly now in use; but the metal may be charged into the furnace even if the plane of the furnace-door is not exactly tangential to the arc of motion of the crane-jib. Economy of space in building the furnaces is thus secured. My improved apparatus may be modified in many ways in form and details of construction of the parts. For example, it is not essential that hydraulic motors be used to operate the parts of the crane, nor is it necessary that the peel should be constructed precisely as I have shown it, since other forms of ingot-supporting mechanism—such as grippers, &c.—may be substituted therefor.

Other modifications, which may be made without departing from my invention, as stated in the following claims, will suggest themselves to the skilled mechanic.

I claim, broadly—

1. In a charging apparatus, a projecting metal support or peel rotary on its longitudinal axis and mechanism for rotating the same, substantially as and for the purposes described.

2. In a charging apparatus, the combination, with the projecting jib, of a projecting radially-movable metal support or peel and a track by which the same is upheld and guided, substantially as and for the purposes described.

3. In a charging apparatus, a projecting radially-movable metal support or peel rotary on its longitudinal axis and mechanism for rotating the same, substantially as and for the purposes described.

4. The combination of the jib and trolley, a swiveled supporting frame or bar carried thereby, and a metal support or peel carried by said supporting-frame, substantially as and for the purposes described.

5. The combination of the jib and trolley, a supporting frame or bar carried thereby, and a metal support or peel carried by said supporting frame or bar and rotary on its longitudinal axis, substantially as and for the purposes described.

6. The combination of the jib and trolley, a swiveled supporting frame or bar carried thereby, a metal support or peel carried by said supporting frame or bar, and a motor carried by the supporting frame or bar and driving said metal support or peel, substantially as and for the purposes described.

7. The combination of the jib and trolley, a swiveled supporting frame or bar carried thereby, a metal support or peel carried by said supporting frame or bar, a wheel supporting said metal support or peel, and a track on which the wheel travels, substantially as and for the purposes described.

8. The combination, with the radially and longitudinally movable peel or metal support, of the wheel 20, the circular track 18, and the chain connected with the peel and adapted to move the same radially, substantially as and for the purposes described.

9. The combination of the jib and trolley,
a swiveled supporting frame or bar carried
thereby, a metal support or peel carried by
said supporting frame or bar, and a racking-
5 cylinder situate on the jib and connected with
the trolley, substantially as and for the pur-
poses described.

In testimony whereof I have hereunto set
my hand this 26th day of August, A. D. 1889.

JOHN W. ANDERSON.

Witnesses:

THOMAS W. BAKEWELL,
H. L. GILL.