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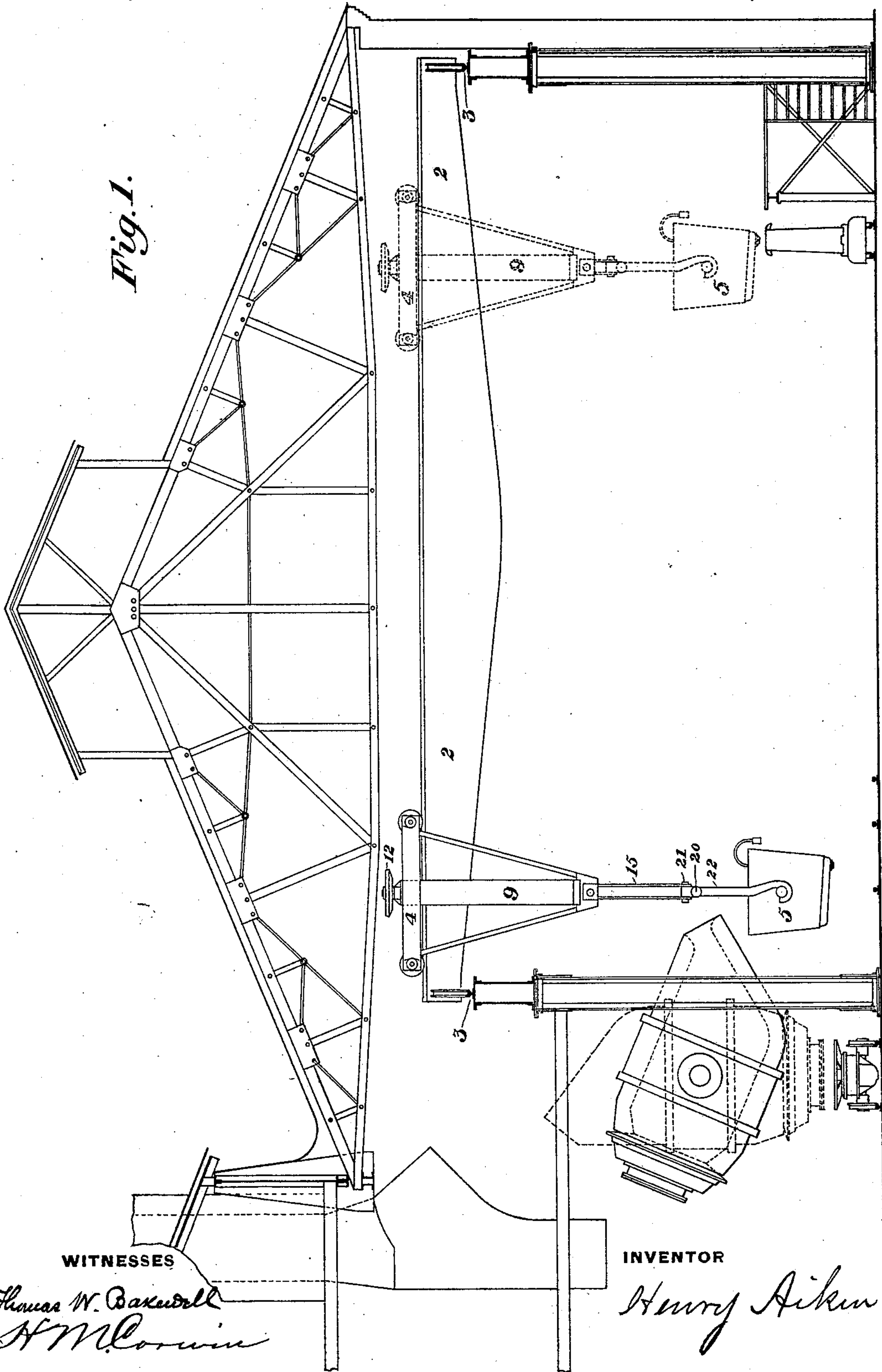
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H. AIKEN.  
CRANE.

No. 507,303.

Patented Oct. 24, 1893.

*Fig. 1.*



WITNESSES

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INVENTOR

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(No Model.)

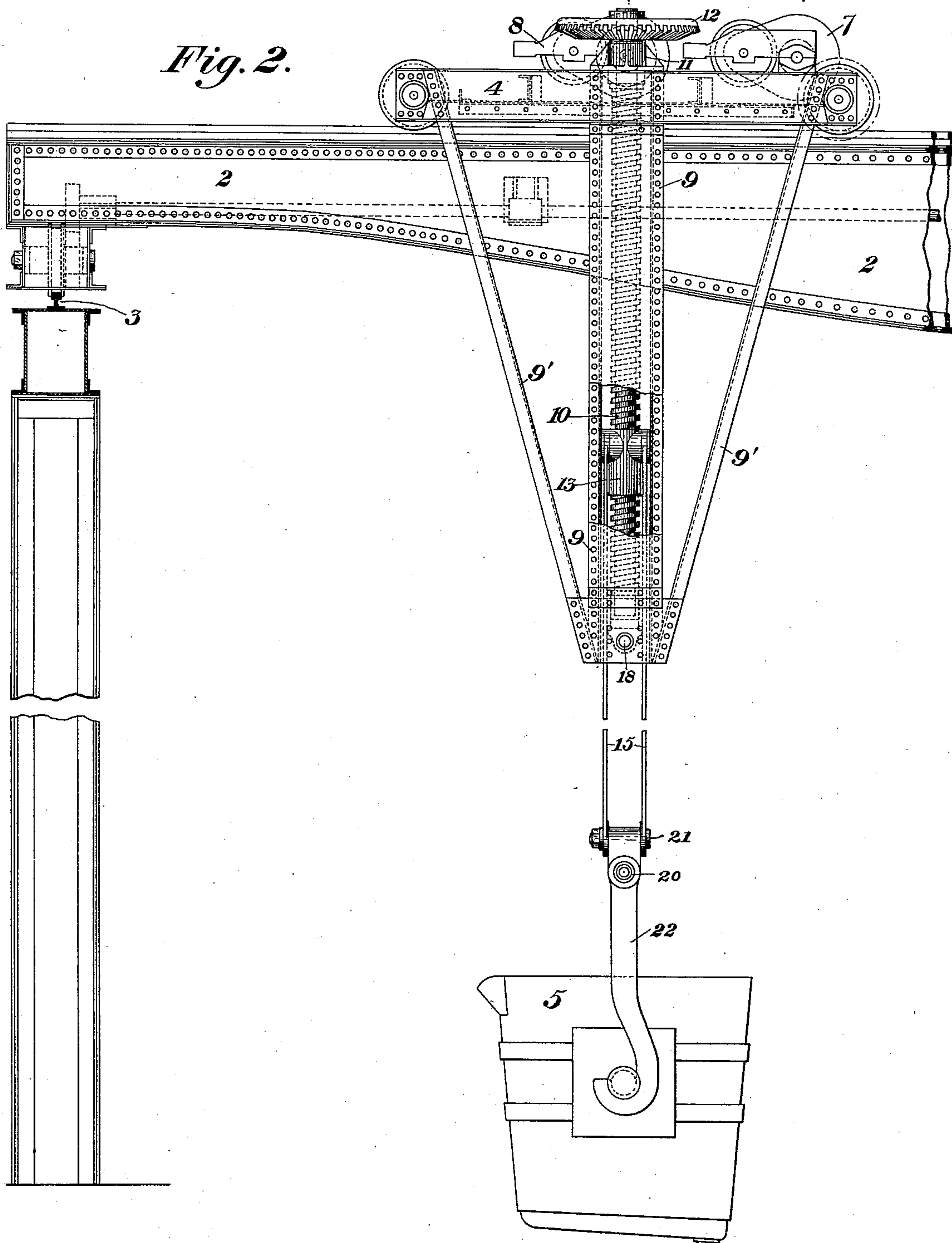
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*Fig. 2.*



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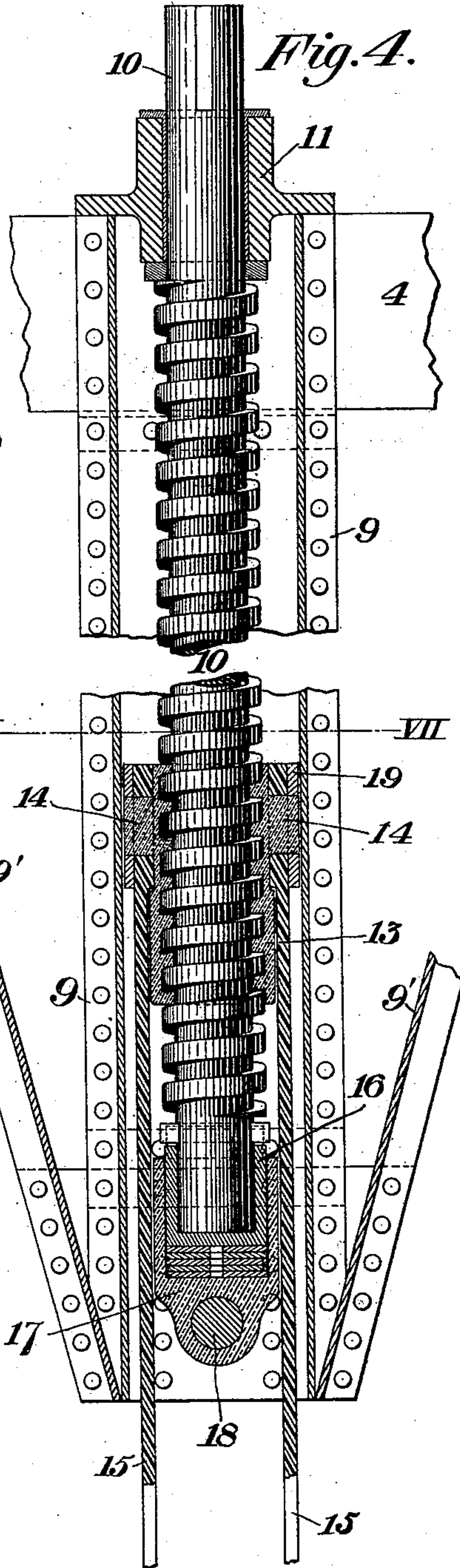
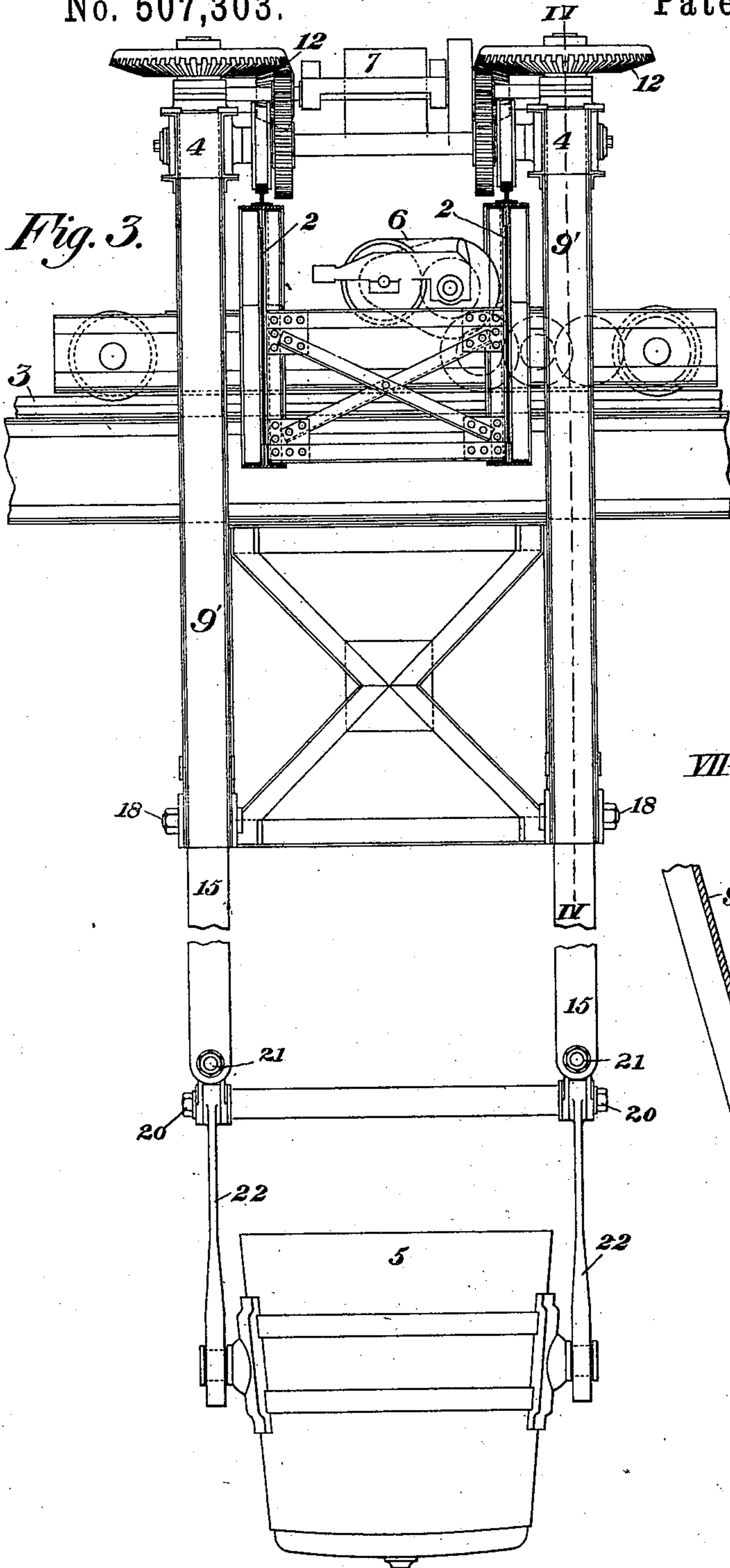
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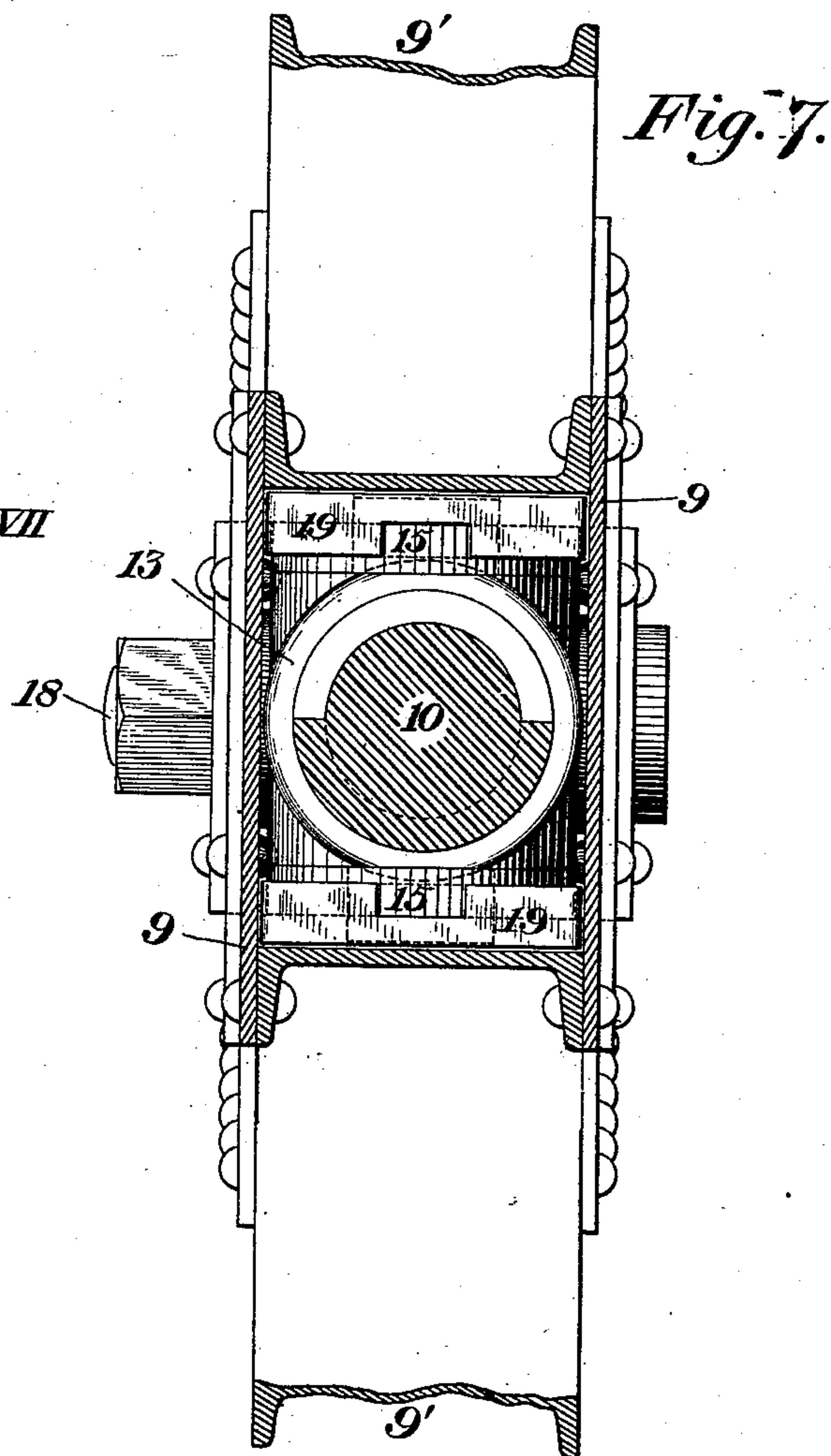
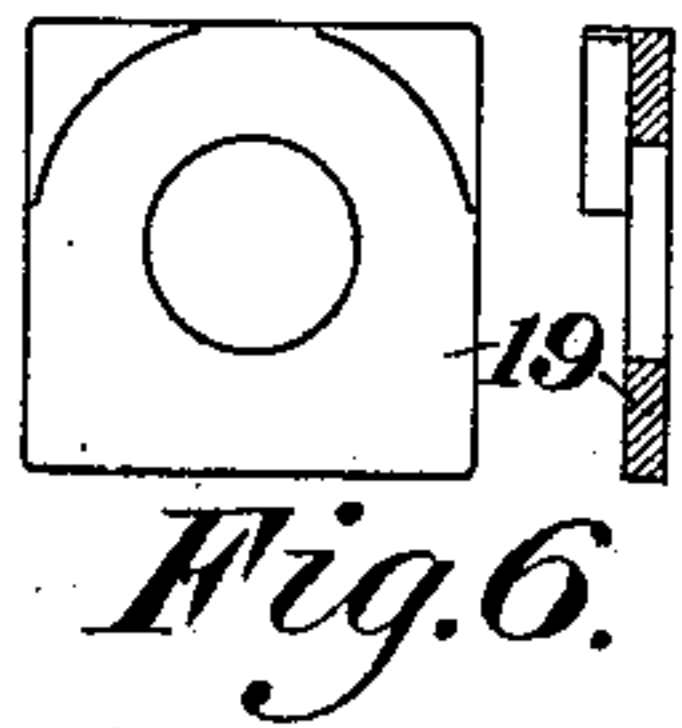
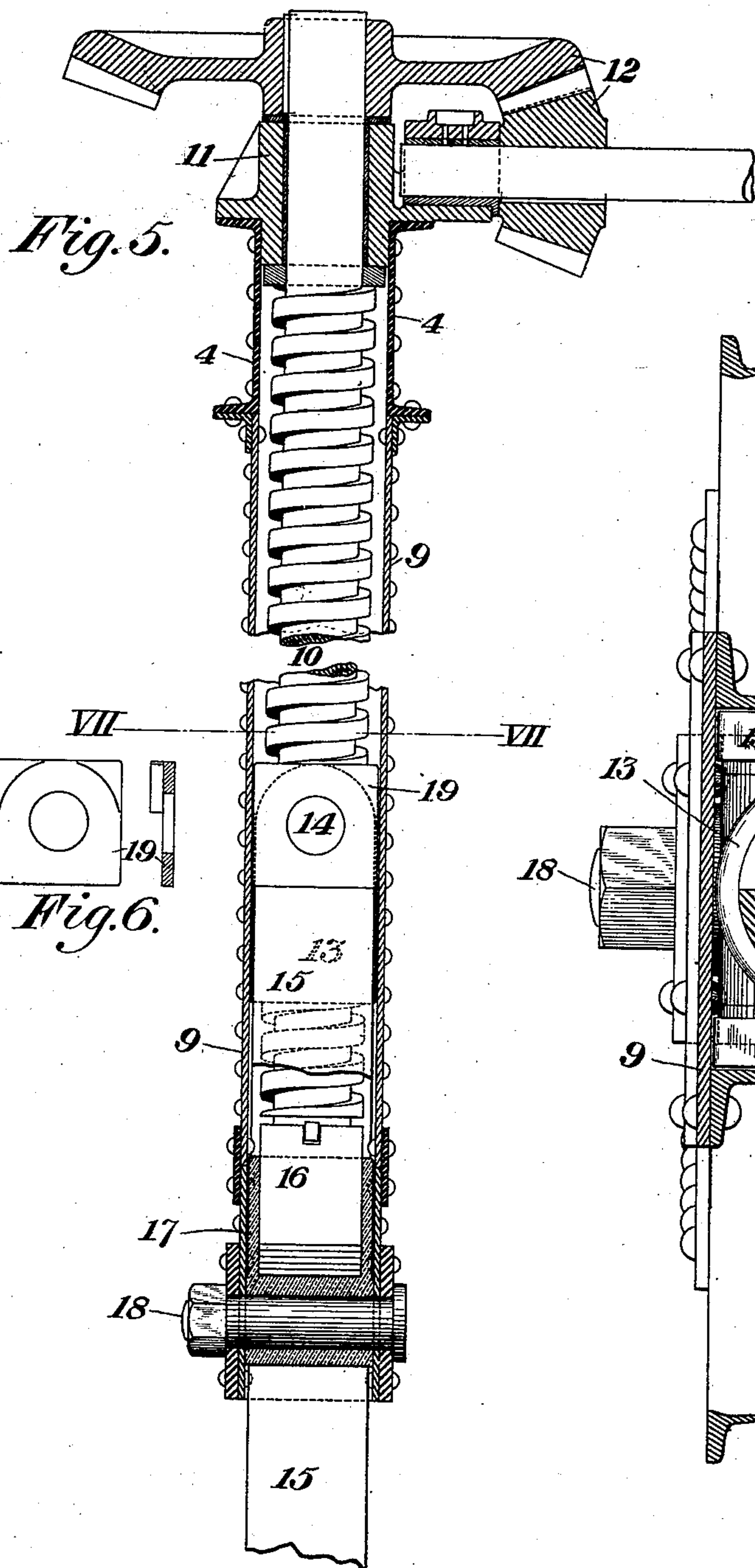
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# UNITED STATES PATENT OFFICE.

HENRY AIKEN, OF PITTSBURG, PENNSYLVANIA.

## CRANE.

SPECIFICATION forming part of Letters Patent No. 507,303, dated October 24, 1893.

Application filed January 5, 1893. Serial No. 457,378. (No model.)

*To all whom it may concern:*

Be it known that I, HENRY AIKEN, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Cranes, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, in which—

Figure 1 is a view of a converter-plant in which is one of my improved cranes. Fig. 2 is a side elevation of part of the jib or bridge of the crane, showing the trolley and the vertical ladle-suspending apparatus, the latter being partly in vertical section. Fig. 3 is an end elevation of the trolley, the jib or bridge being shown in cross-section. Fig. 4 is a vertical longitudinal section on the line IV—IV of Fig. 3, but on a larger scale. Fig. 5 is a side elevation of the part shown in Fig. 4, the casing for the screw-shaft being in vertical section. Fig. 6 is a detail view of parts. Fig. 7 is a horizontal cross-section on the line VII—VII of Figs. 4 and 5, but on a larger scale.

Like symbols of reference indicate like parts in each.

Fig. 1 of the drawings illustrates the operation of the crane in carrying a ladle,—the use for which I have especially designed it.

2 is the crane-jib or bridge, supported upon an elevated track 3 on which it is adapted to be moved laterally from place to place in the mill.

4 is a trolley mounted on the jib and having mechanism hereinafter particularly described for carrying a ladle 5. By the motion of the trolley on the jib and of the jib on its track, the ladle can be carried readily from the converter or furnace, where it receives its charge of metal, to the molds into which it discharges the same.

In Fig. 3 I show a motor 6 by which the jib is moved on its track, and a motor 7 on the trolley by which the trolley is moved on the jib. There is also another motor 8 on the trolley, the purpose of which I shall explain hereinafter. These are preferably electric motors, the current for which is supplied through conductors, not shown.

For supporting and lifting the burden of the crane I employ screw mechanism comprising upright screw shafts, preferably two

in number, one being at each side of the trolley, and as both are or may be similar in construction, the description of one will suffice. In order to uphold the screw I inclose it within a frame 9, constituted of beams preferably arranged to afford a hollow protective casing. This frame may be braced from the trolley by diagonal braces 9'. The screw 10 is journaled at its upper end in a bearing 11 on the trolley, and has gearing 12 by which it is rotated from the motor 8. At the lower end the screw is set within a foot 16, supported by a step-bearing 17 upheld by a pin 18 within the frame. The pivotal support 18 enables the screw-shaft to adjust itself automatically in position when in use.

13 is a nut set on the screw 10 within the casing 9, and provided with lateral trunnions 14, from which two upright hanger-bars 15 are suspended and extend down within and below the casing, so as to afford direct means of holding the ladle. In order to prevent the nut from turning within the casing 9, which serves as a guide for the vertical travel of the nut, I employ washers 19, which are fitted upon the trunnions and have square shoulders or corners which bear upon opposite sides of the casing (Figs. 5, 6 and 7) and effect the desired result. With this construction it is clear that when the screw is rotated by the motor, its turning within the nut will cause the nut to move vertically upward or downward, as the case may be, and to carry with it the hanger-bars 15. The hanger bars of both screws move in unison, for the screws themselves are geared to the same motor, and at their lower ends both sets of hanger-bars are connected by double pivots 20, 21, forming a universal joint, to ladle-supporting bars or hooks 22. The use of two screws is important and very desirable, because of the steadiness of action and efficiency which they afford.

The mechanism above described constitutes very effective yet simple means of raising and lowering the ladle. It is compact, reduces the rapid motion of the motor to a slow powerful motion, does away with need of employing cumbrous and inconvenient suspending chains, and is safe and reliable in its action. The incasing of the screw in a frame closed at the sides and ends also claimed herein, is



advantageous, because by including all slag and dirt which are so abundant in plants such as that illustrated in my drawings, it renders the apparatus very durable.

5 Within the scope of my broadest claims, the nuts may be made to rotate and the screws to lift vertically, the ladle-hangers being secured to the screws.

I claim—

10 1. In lifting mechanism for ladle-cranes, the combination of two upright screw-shafts, and nuts; rotating mechanism connected with both and adapted to rotate simultaneously; means for suspending the ladle, casings for the screw-  
15 shafts, and ladle-hangers extending up within the casings; substantially as described.

2. In crane lifting-mechanism, the combination of an upright screw-shaft, a vertically traveling nut on the screw-shaft, a motor for  
20 turning the screw-shaft, means for suspending the crane-burden from the nut, and an upright guide for the nut; substantially as described.

3. In crane lifting-mechanism, the combination of an upright screw-shaft, a vertically  
25 traveling nut on the screw-shaft, a motor for turning the screw-shaft, means for suspending the crane-burden from the nut, an upright guide for the nut, and an inclosing  
30 frame within which the nut travels; substantially as described.

4. In crane lifting mechanism, the combination of an upright screw-shaft, a vertically-  
35 traveling nut on the screw-shaft, a motor for turning the screw-shaft, trunnions on the nut, and hangers fitted on the trunnions; substantially as described.

5. In crane-lifting-mechanism, the combination of an upright screw-shaft, a frame on which the shaft is upheld by a pivotally supported step, a vertically traveling nut on the screw-shaft, a motor for turning the screw-shaft, means for suspending the crane-burden from the nut, and an upright guide for the nut; substantially as described. 40

6. In crane lifting mechanism, the combination of an upright screw-shaft, a vertically traveling nut on the screw-shaft, a motor for turning the screw-shaft, means for suspending the crane-burden from the nut, an upright guide for the nut, and an inclosing frame within which the nut travels, and on which the screw-shaft is stepped; substantially as described. 45

7. In crane-lifting mechanism, the combination of an upright screw-shaft, a vertically-  
55 traveling nut on the screw-shaft, a motor for turning the screw-shaft, trunnions on the nut, hangers fitted on the trunnions, an inclosing frame, and guide-washers on the trunnions  
60 bearing on the frame; substantially as described.

8. In a crane, the combination with lifting mechanism, of parallel ladle-supporting bars  
22, hangers upholding the same, and two sets  
65 of pivots set at right angles to each other and connecting each of the bars respectively with its hanger; substantially as described.

In testimony whereof I have hereunto set my hand.

HENRY AIKEN.

Witnesses:

W. B. CORWIN,  
H. M. CORWIN.