

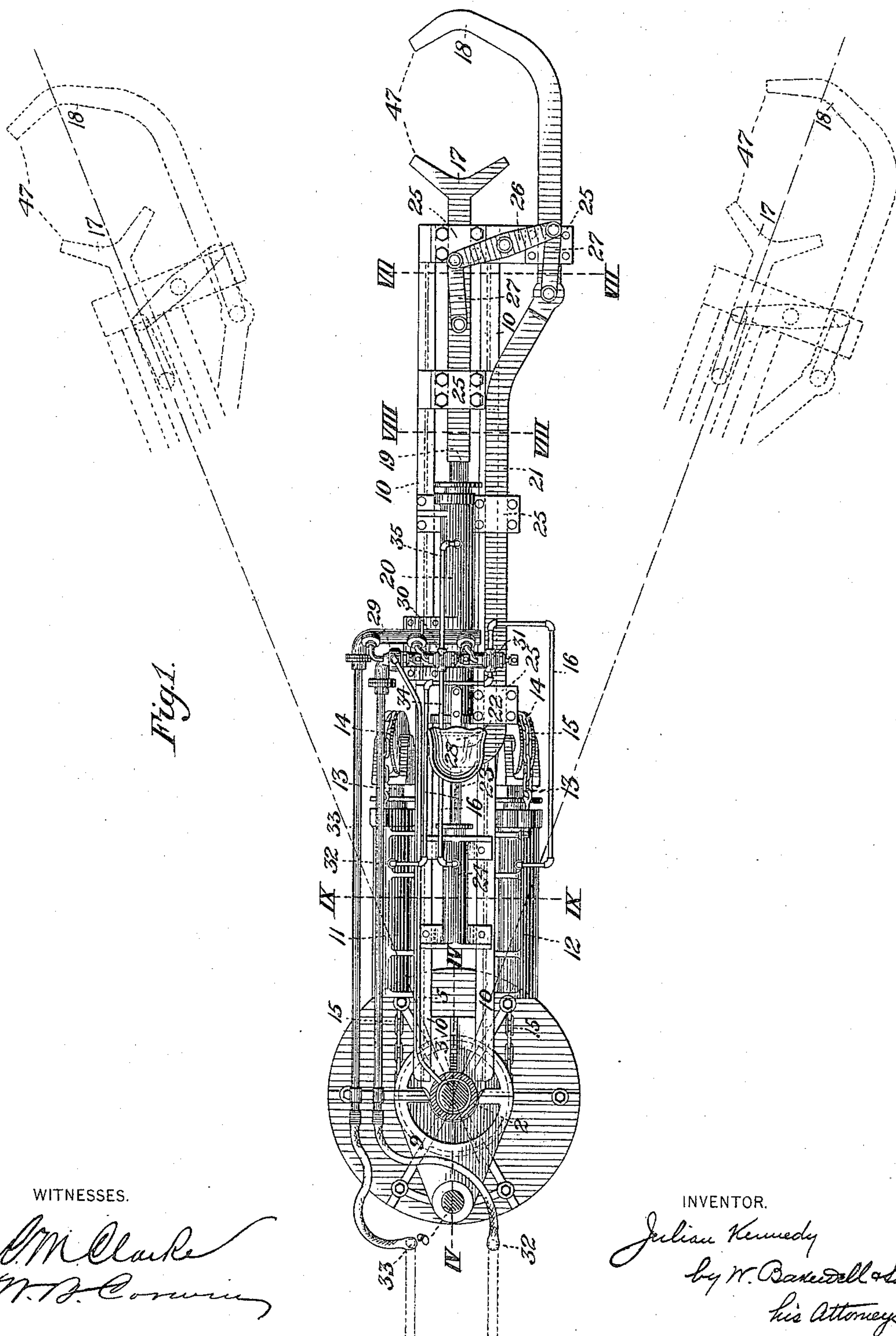
(No Model.)

5 Sheets—Sheet 1.

J. KENNEDY.
MILL APPLIANCE.

No. 446,526.

Patented Feb. 17, 1891.



WITNESSES.

A. M. Clarke
W. T. Corwin

INVENTOR.

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by W. B. Randall & Sons
his Attorneys

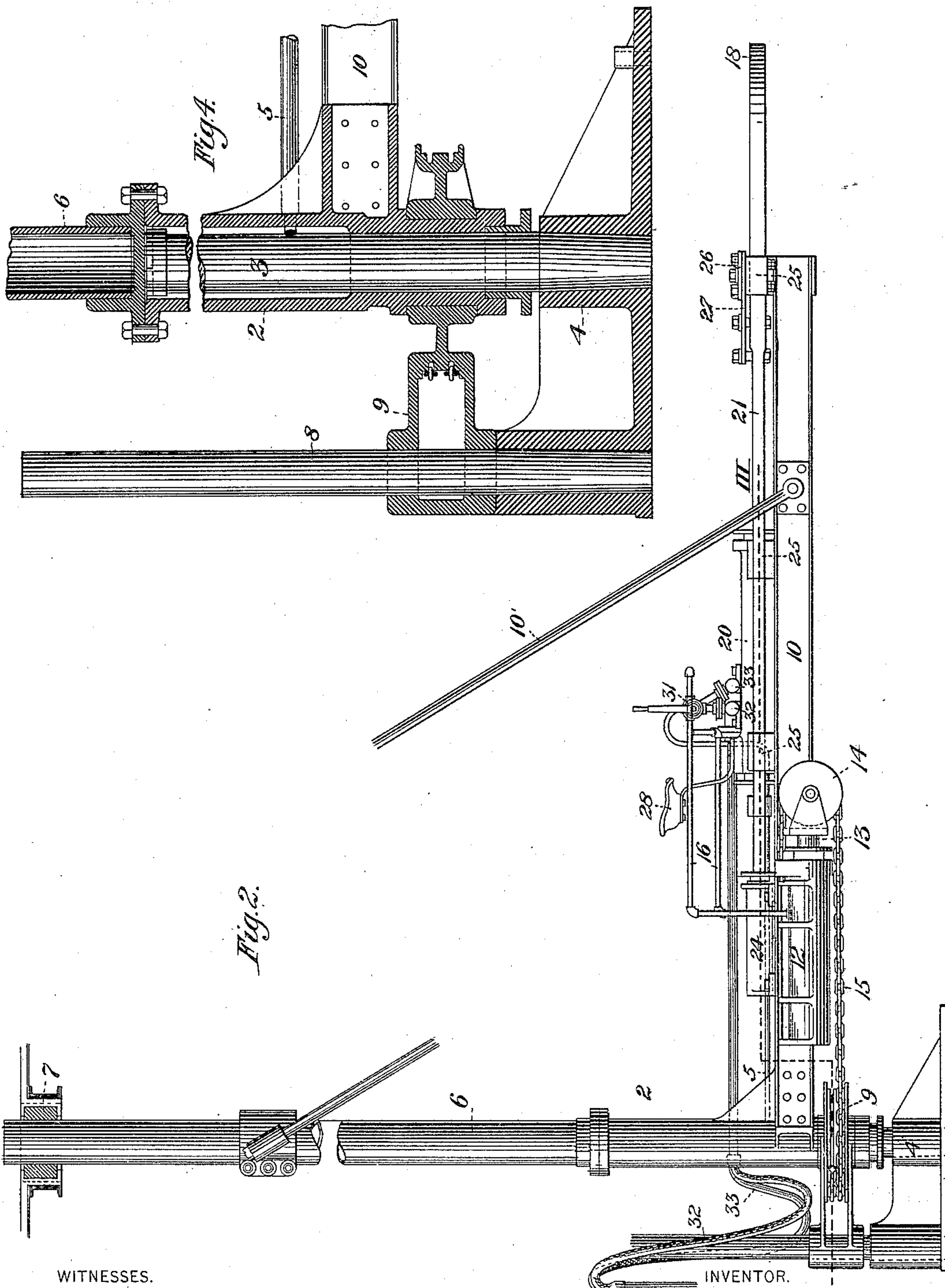
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(No Model.)

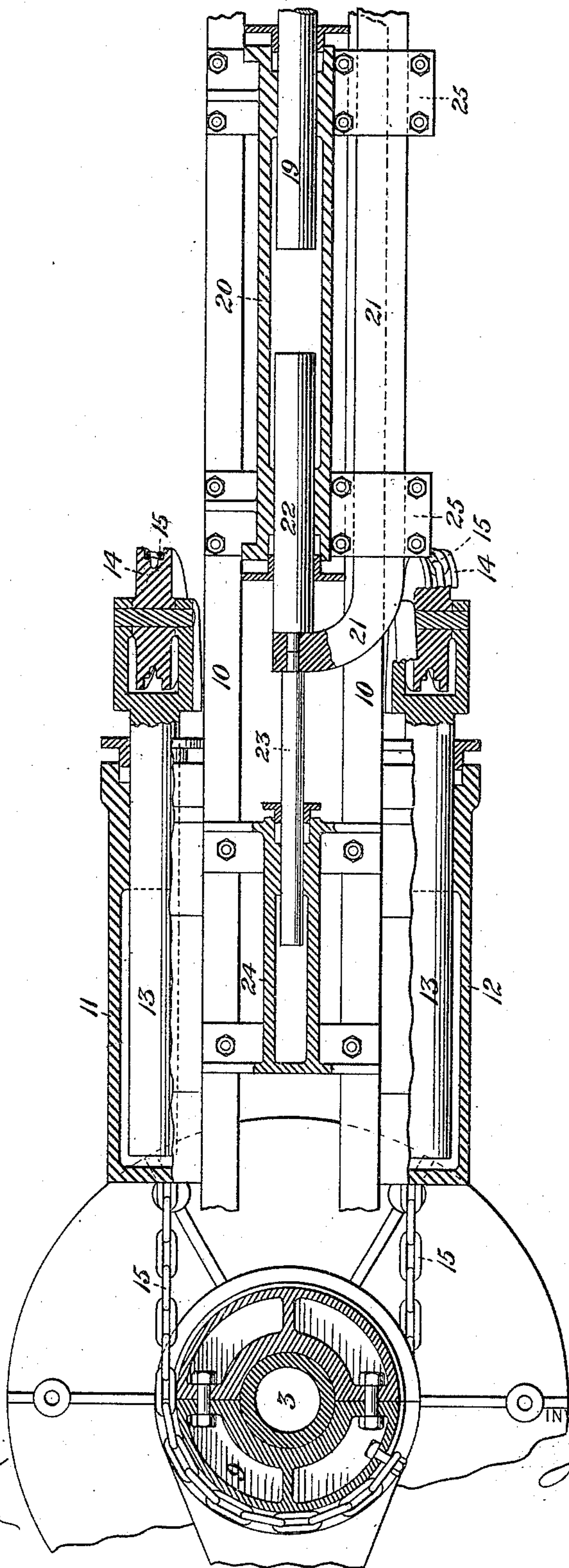
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Fig. 3.



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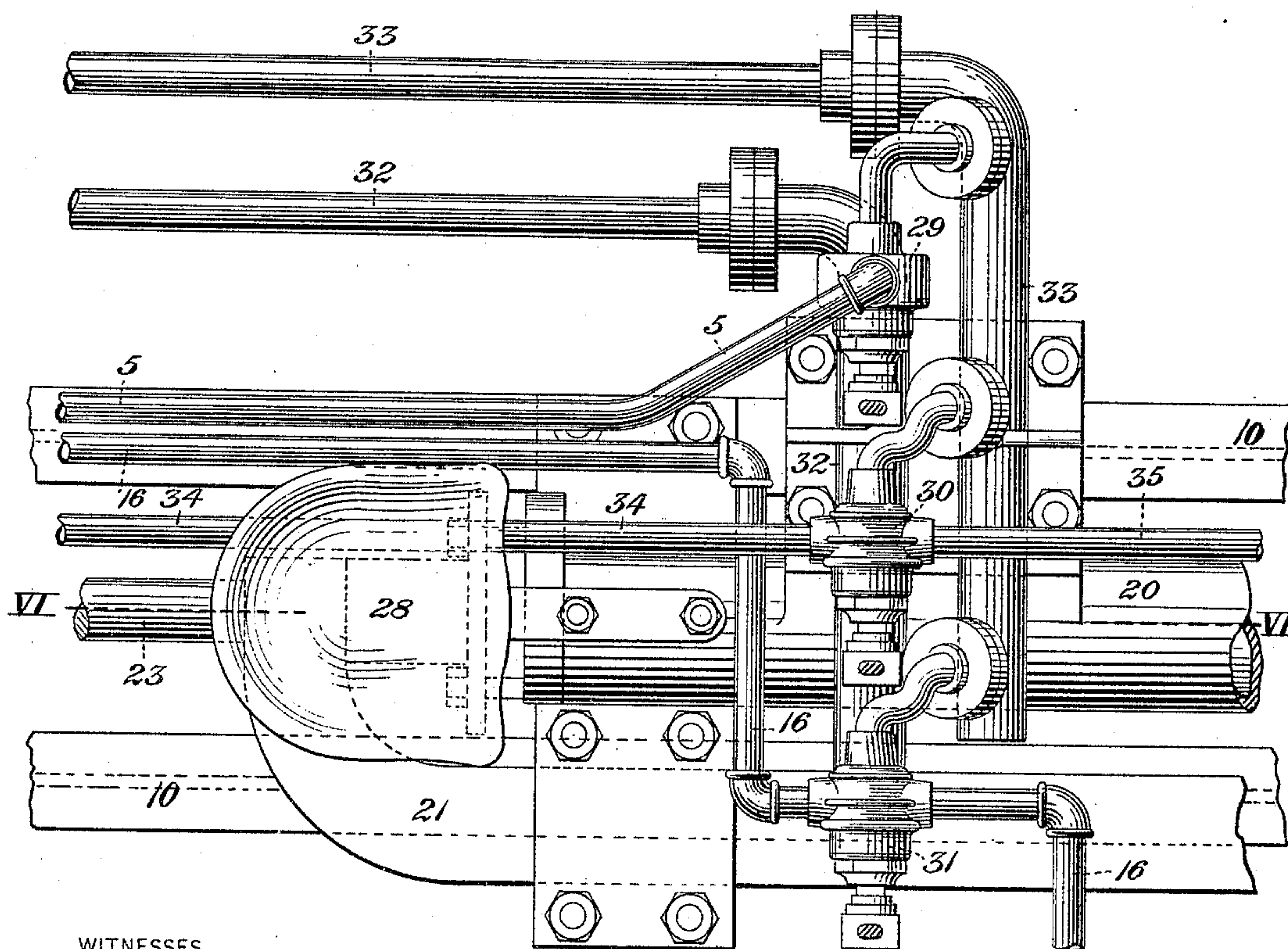
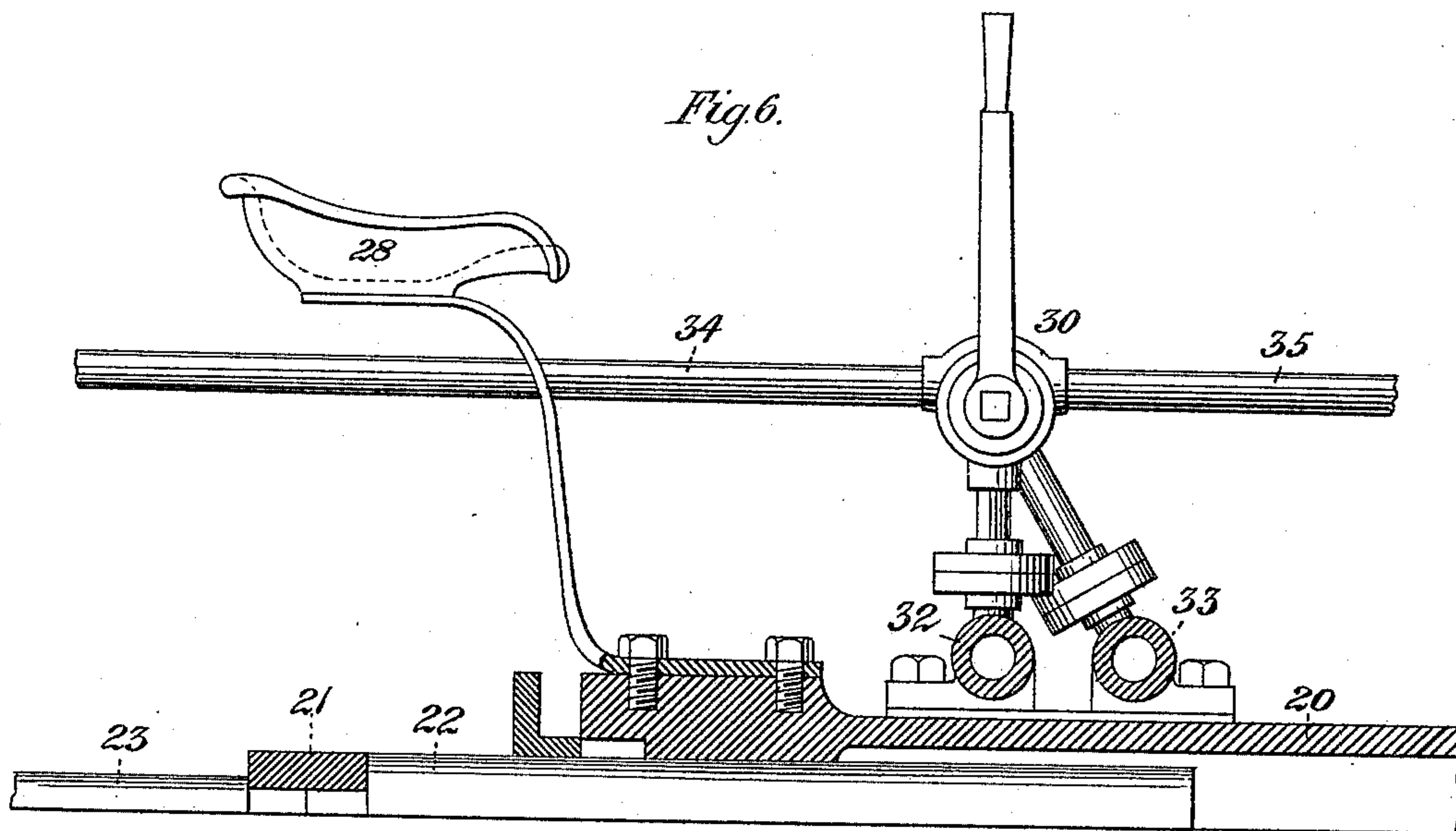
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Fig. 5.

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(No Model.)

5 Sheets—Sheet 5.

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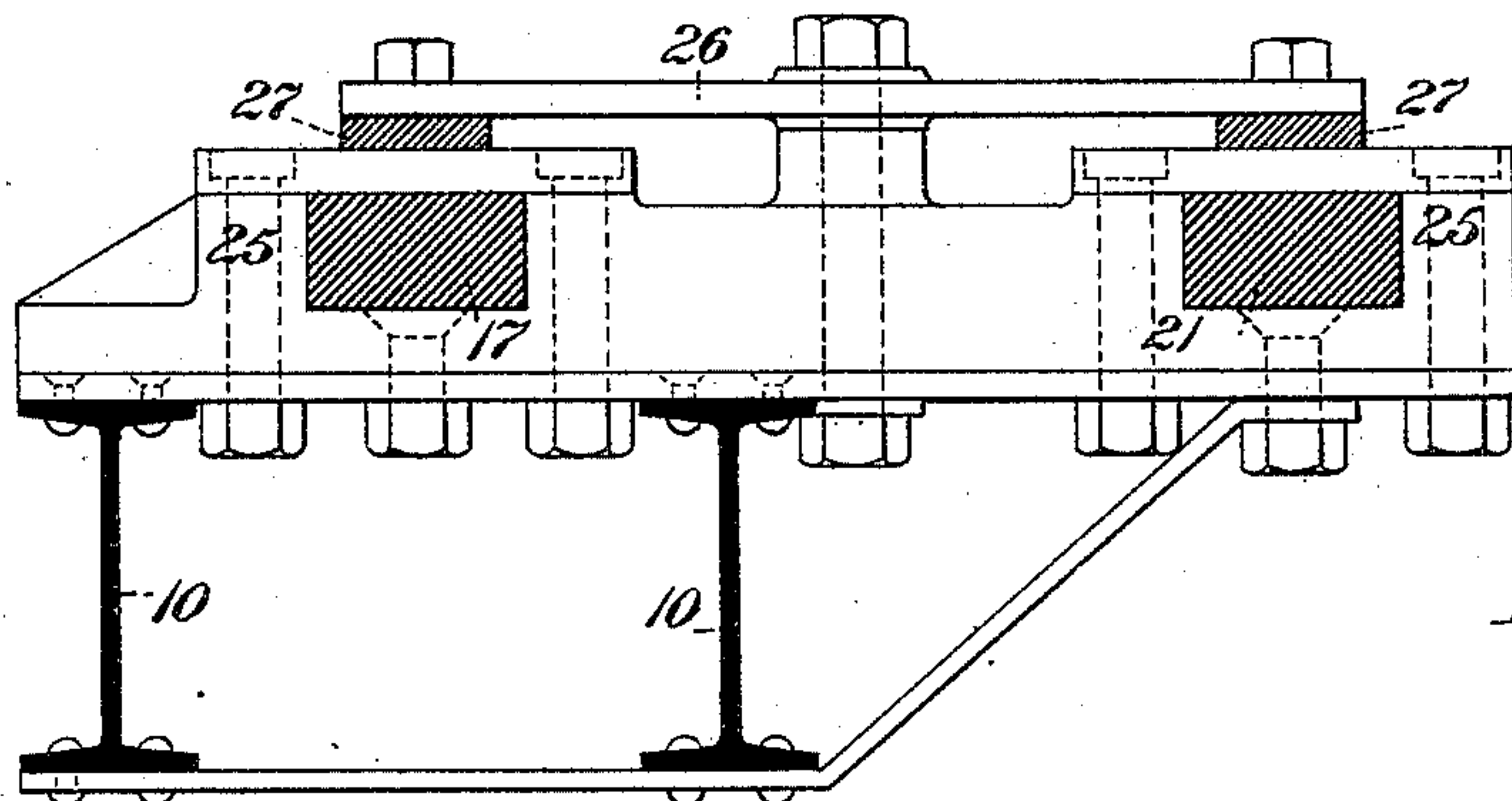


Fig. 7.

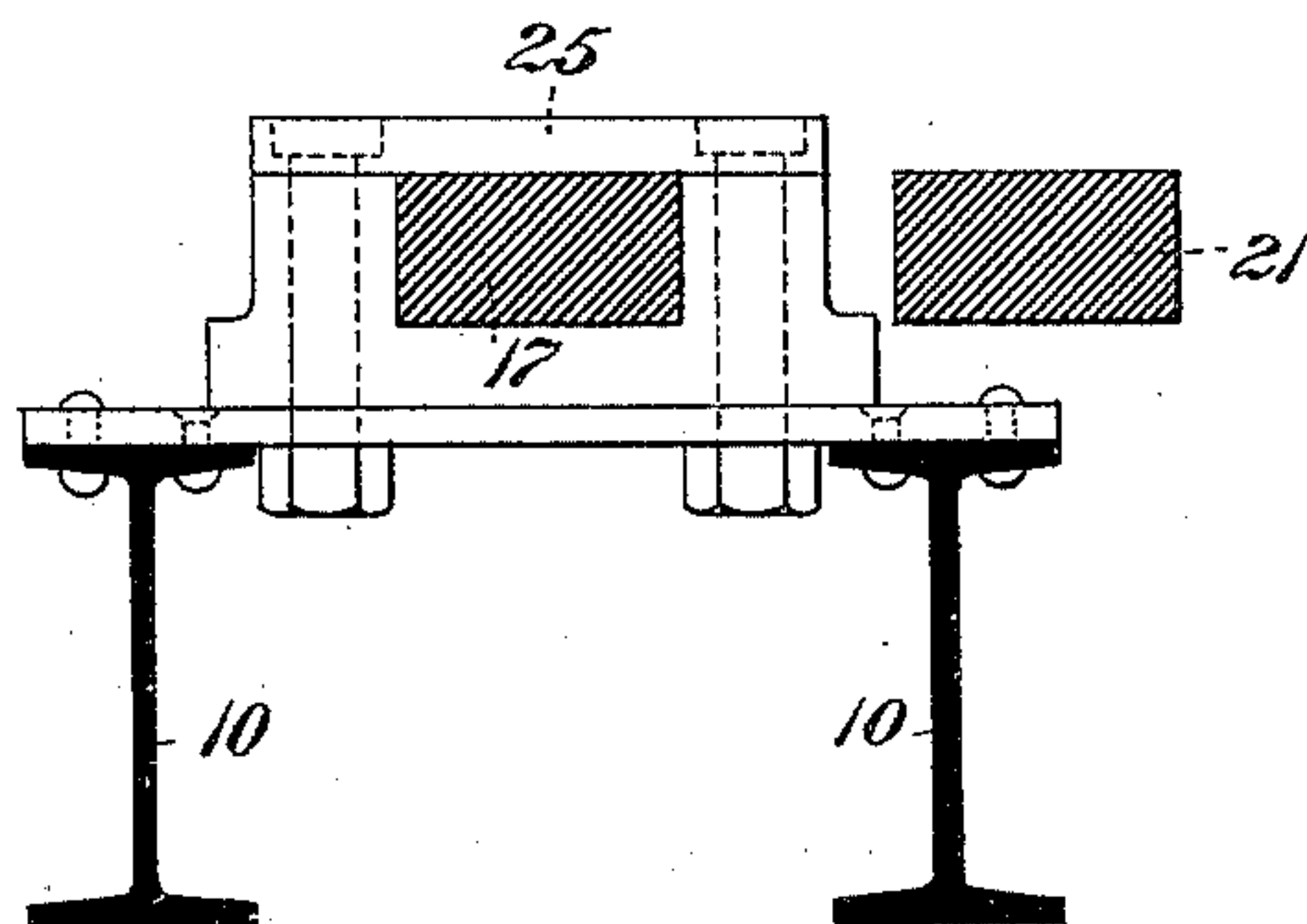
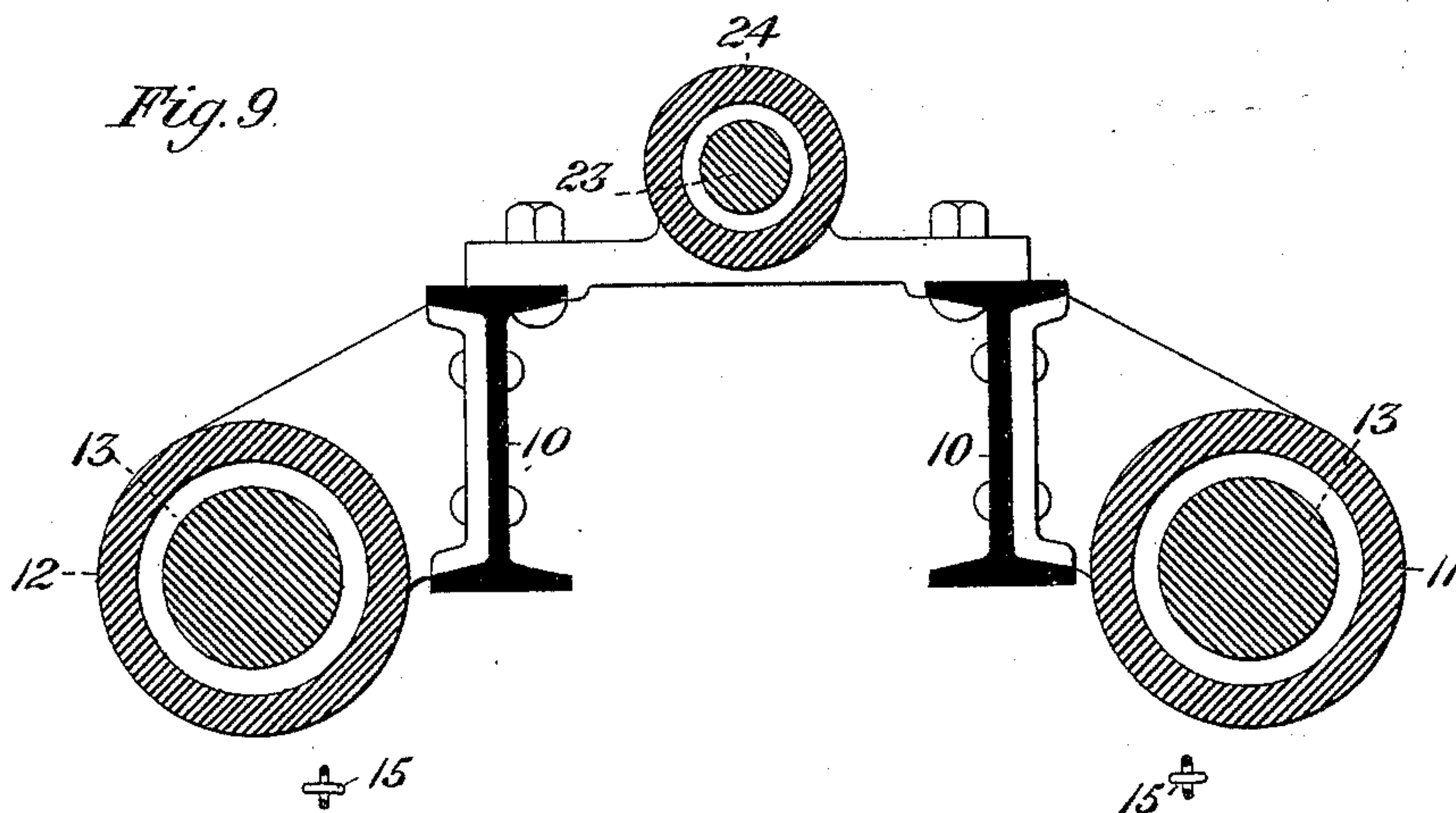


Fig. 8.



Fig. 9.



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UNITED STATES PATENT OFFICE.

JULIAN KENNEDY, OF LATROBE, PENNSYLVANIA.

MILL APPLIANCE.

SPECIFICATION forming part of Letters Patent No. 446,526, dated February 17, 1891.

Application filed December 30, 1889. Serial No. 335,359. (No model.)

To all whom it may concern:

Be it known that I, JULIAN KENNEDY, of Latrobe, in the county of Westmoreland and State of Pennsylvania, have invented a new and useful Improvement in Mill Appliances, of which the following is a full, clear, and exact description.

In the accompanying drawings, Figure 1, Sheet 1, is a plan view of my improved metal-gripping device. Fig. 2, Sheet 2, is a side elevation thereof. Fig. 3, Sheet 3, is a sectional plan view, the section being on the line III III of Fig. 2. Fig. 4, Sheet 2, is a vertical sectional view of the foot of the mast. Fig. 5, Sheet 4, is a plan view of a part of the jib, showing the seat for the operator and the water-connections. Fig. 6 is a vertical longitudinal section on the line VI VI of Fig. 5. Figs. 7, 8, and 9, Sheet 5, are vertical cross-sectional views on the lines VII VII, VIII VIII, and IX IX of Fig. 1.

Like symbols of reference indicate like parts in each.

Referring to the drawings, 2 represents the upright cylinder of the crane.

3 is the stationary plunger, which is fixed at the base in a step 4 and passes up within the cylinder, as shown in Fig. 4.

5 is a water-supply pipe which enters the cylinder.

The mast 6 of the crane is fixed to the upper end of the cylinder and extends vertically therefrom up through an elevated steadiment or bearing 7, in which it may turn and through which it may move longitudinally. As the strain upon the mast is comparatively small, it may be made of light material. Ordinary gas-pipe will do very well for this purpose.

In the operation of the crane, when it is desired to raise its burden, water is admitted into the cylinder 2, with the effect of raising the cylinder and the mast on the stationary plunger.

8 is a vertical guide-post set on the step 4 adjacent to the cylinder 2, and 9 is a slide-block which fits loosely around the post 8 and encircles the cylinder 2 between shoulders formed thereon, as shown in Fig. 4. For purposes hereinafter explained the portion of this block surrounding the cylinder serves the function of a fixed sheave and is made of

circular form, and in order that it may be easily set on the cylinder I prefer to make it in two pieces adapted to be bolted together, as shown in Fig. 3.

10 is the jib, formed of suitably-arranged beams, as shown in Figs. 1, 2, and 3, fixed to the vertical crane-cylinder, as shown in Fig. 4, and connected with the mast by diagonal braces or struts 10', whose upper ends are set in sockets in a divided annular collar which is fitted around the mast and is clamped thereon by bolts. As this collar is held in position without in any way necessitating the cutting of the mast, it does not weaken its structure and enables the mast to be made of very light material.

At the sides of the jib, near the inner end thereof, are cylinders 11 and 12, having plungers 13, carrying at their outer ends pulleys 14. Chains 15 are fixed to the circular portion of the block 9 and extend thence on respectively opposite sides of the jib around the pulleys 14 and to the ends of the cylinders 11 and 12 or to other fixed points on the jib to which they are attached. These cylinders 11 and 12 afford means for turning the crane on its axis, since if the plunger of one of the cylinders be projected the force exerted thereby on its chain, which is attached to the jib and to the fixed circular portion of the slide-block, will pull the jib around in the direction of the side on which the cylinder is situated.

16 are the pipes which supply water or other motive fluid to these cylinders.

The gripping mechanism by which the metal bloom or ingot may be seized and carried consists of two oppositely-acting angular jaws 17 and 18. The shank of the jaw 17 is fixed to the end of a plunger 19, which projects from the front end of a cylinder 20 on the jib, and the shank 21 of the other jaw 18 is fixed to a plunger 22, which projects from the rear end of said cylinder. It is also connected with the plunger 23 of a smaller retracting-cylinder 24, as shown in Fig. 3. The shanks of the gripping-jaws are mounted in suitable guide-boxes 25 and are connected by a lever 26, which is pivoted to the frame of the jib and is provided with links 27, pivotally connecting it to the gripper-shanks, so that neither of said shanks can move unless the other moves correspondingly and to an equal

extent in the opposite direction. Gearing or other mechanical devices may be substituted for the lever and links to perform the same function.

5 In operating the grippers to seize a metal piece they are first separated by admitting water into the small cylinder 24, the effect of which is to project the plunger 23, the gripper-shank 21, and by means of the links and
10 lever 27 and 26 to correspondingly retract the gripper 17. Now if water be admitted to the cylinder 20 it will project the plungers 19 and 22, thereby retracting the gripper 18 and projecting the gripper 17, which, under the re-
15 straint of their connecting mechanism, before described, move in opposite directions to the same extent, thus grasping the metal piece around which the grippers have been placed. The advantage of this is that the grippers are
20 always situate at equal distances from a central point and that when the metal piece is grasped, no matter what be its diameter, its center will be brought to a fixed or absolute point on the jib. This construction and mode
25 of operation of the grippers are of especial advantage in the use to which I have particularly designed the apparatus--namely, the handling of circular ingots used in the manu-
30 facture of railway-ties--since I am enabled by the mere act of grasping the ingot with the grippers to cause it to be centered automati-
cally at a fixed point, thereby enabling it to be punched and hammered with great accu-
35 racy. The centering of the circular ingot is also facilitated by the angular or wedge shape of the jaws.

As shown in the drawings, the grippers are constructed so as to be open on one side. This is of material advantage, because it en-
40 ables the metal to be grasped by merely moving the crane laterally to cause the grippers to inclose it without making it necessary to place the grippers in position from above. The ends of the gripping-jaws are preferably
45 provided with points or teeth 47, so that when it is desired to cause a metal piece to swing by gravity into a vertical position it may be gripped between these teeth at opposite points situate between the end of the piece and its
50 center of gravity.

The crane is controlled in all its motions by an operator, who may be stationed on a seat 28, the valves 29, 30, and 31, controlling the different water-connections, being situate
55 directly in front of him. To this end I employ a water-supply pipe 32 and an exhaust-pipe 33, connected with the crane by flexible connections, as shown in Fig. 2, and extend-
60 ing along the jib to the valves 29, 30, and 31. From the valve 29 the water-pipe 5 extends to the vertical cylinder 2. From the valve 30 pipes 34 and 35 extend to the cylinders 24 and 20, and from the valve 31 the pipes 16 extend to the cylinders 11 and 12. All of
65 these cylinders are single-acting. For example, in the case of the cylinders 11 and 12 the projection of one of the plungers and the

turning of the jib will automatically retract the other plunger.

The valves 30 and 31 are four-way valves 70 adapted to connect either of their respective cylinders with the water-supply and the other with the exhaust, or to cut off both from the water-supply. Thus by simple manipulation of the valves the operator is enabled to move 75 the jib vertically, to swing it radially on the axis of the mast, and to operate the grippers, and as the operator is carried on the jib he constantly is at the same distance from the grip-
80 pers, so that whether the jib is moved vertically or radially he is at the same position relatively to the work which he performs. The crane may therefore be handled with great facility and little labor and attention.

The advantages of my improved apparatus 85 have been already indicated in a general way. It is a means of saving a considerable amount of labor, it is simple in its construction, and is very rapid and efficient in its ac-
90 tion. Although it is designed especially for use in manipulating circular ingots, it will be understood that the parts and combinations of the apparatus separately claimed by me are not limited in their application to such use,
95 but that they may be employed for any other purpose to which they are suited.

I claim--

1. In apparatus for gripping and conveying metal pieces, the combination of a movable carrier or jib, oppositely-movable grippers 100 mounted thereon and having opposite angular faces shaped to afford an angular cavity for receiving and centering an interposed metal piece, a motor which actuates the grip-
105 pers, and connecting mechanism by which the grippers are connected and caused to move to an equal extent, substantially as and for the purposes described.

2. In apparatus for gripping and conveying metal pieces, the combination of longitudi- 110 nally-acting shanks having horizontal gripping-jaws, and a motor which causes the jaws to approach and diverge, substantially as and for the purposes described.

3. In apparatus for gripping and conveying 115 metal pieces, the combination of a horizontally-movable jib and gripping-shanks mounted thereon and having jaws projecting horizontally therefrom and open at one side, whereby by horizontal motion of the jib the metal piece 120 may be inclosed between the jaws, substantially as and for the purposes described.

4. In apparatus for gripping and conveying metal pieces, the combination of longitudi- 125 nally-movable shanks having horizontal angular gripping-jaws, a motor by which the shanks are moved longitudinally, and connecting mechanism by which the grippers are connected and caused to move simultane-
130 ously to an equal extent, substantially as and for the purposes described.

5. The combination, with the jib, of grip- pers carried thereby and power-driven plun- gers by which the gripper-jaws are individu-

ally moved, substantially as and for the purposes described.

6. The combination, with the jib, of grippers carried thereby and a hydraulic cylinder having oppositely-projecting plungers connected with the gripper-jaws, substantially as and for the purposes described.

7. The combination, with the jib, of grippers carried thereby, a hydraulic cylinder having oppositely-projecting plungers connected with the gripper-jaws, mechanism connecting the jaws and causing them to move symmetrically, and a retracting-cylinder for opening the jaws, substantially as and for the purposes described.

8. In apparatus for gripping and conveying metal pieces, the combination of longitudinally-movable shanks having horizontal gripping-jaws provided with oppositely-projecting spurs by which the piece may be grasped pivotally to permit it to swing into a vertical position, substantially as and for the purposes described.

9. The combination of the vertically and radially movable jib, a motor carried thereby and connected with a place of attachment vertically movable with the jib, but otherwise stationary, whereby by operation of a motor the jib may be swung on its axis, substantially as and for the purposes described.

10. The combination, in a crane, of an upright cylinder and plunger, one of which is vertically movable and rotatory, of a jib projecting from the vertically-movable part, a mast also projecting vertically therefrom, and a top steadiment through which the mast is movable longitudinally and in which it is rotatory, substantially as and for the purposes described.

11. In a crane, the combination of the vertically and radially movable jib and mast, an upright guide-post, a vertically-movable guide-block mounted on the post and secured to the mast, permitting rotation on its vertical axis, and turning cylinders mounted on the jib and having flexible connections with

the guide-block, substantially as and for the purposes described.

12. In a crane, the combination of the vertically and radially movable jib and mast, an upright guide-post, a vertically-movable guide-block mounted on the post and secured to the mast, permitting rotation on its vertical axis, and turning cylinders mounted on the jib and having flexible connections with a sheave-shaped portion of the guide-block, substantially as and for the purposes described.

13. The combination of the vertically and radially movable jib having grippers thereon, cylinders for raising and swinging the jib and operating the grippers, and valves carried by the jib and controlling said cylinders, substantially as and for the purposes described.

14. In apparatus for gripping and conveying metal pieces, the combination, with a radially and horizontally movable jib, of a motor fixed to the jib and carried thereby, metal grippers also carried by the jib and connected with the motor, by which they are moved in opposite directions to or from each other, and mechanism connecting the grippers and causing them to move simultaneously to an equal extent, whereby in every position of the grippers the central point between their jaws and the central point of the piece grasped thereby shall be constant relatively to the jib, substantially as and for the purposes described.

15. In a crane, the combination of a vertically-movable jib, a cylinder by which the jib is raised, a mast movable vertically with the jib, and a top bearing or steadiment through which the mast is movable vertically and in which it is rotatory, substantially as and for the purposes described.

In testimony whereof I have hereunto set my hand this 23d day of December, A. D. 1889.

JULIAN KENNEDY.

Witnesses:

W. B. CORWIN,
H. L. GILL.