

219-1

No. 865,047.

J. KENNEDY.
INGOT MANIPULATOR.
APPLICATION FILED JULY 20, 1906.

PATENTED SEPT. 3, 1907.

4 SHEETS—SHEET 1.

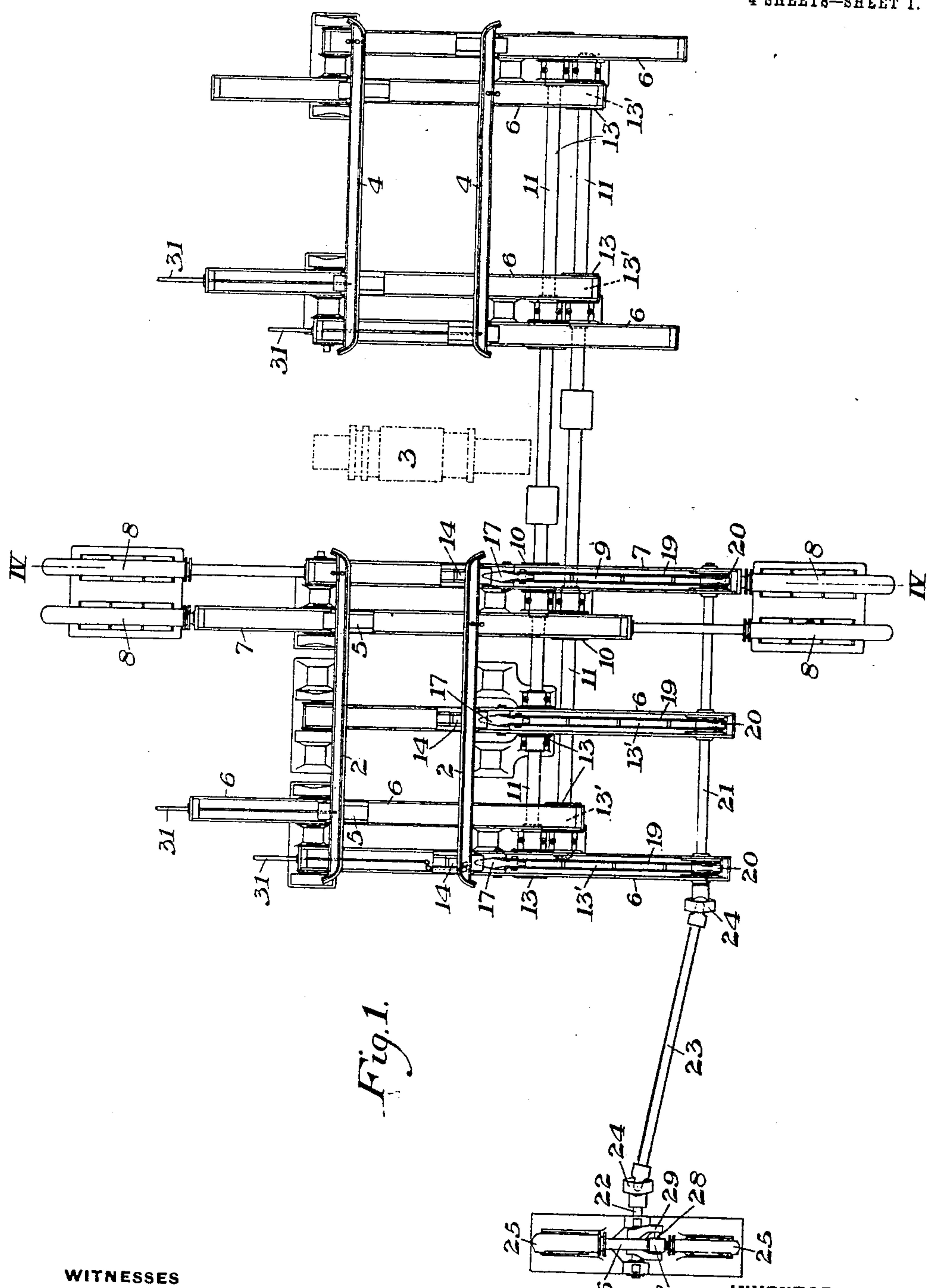


Fig. 1.

WITNESSES

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INVENTOR

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4 SHEETS—SHEET 2.

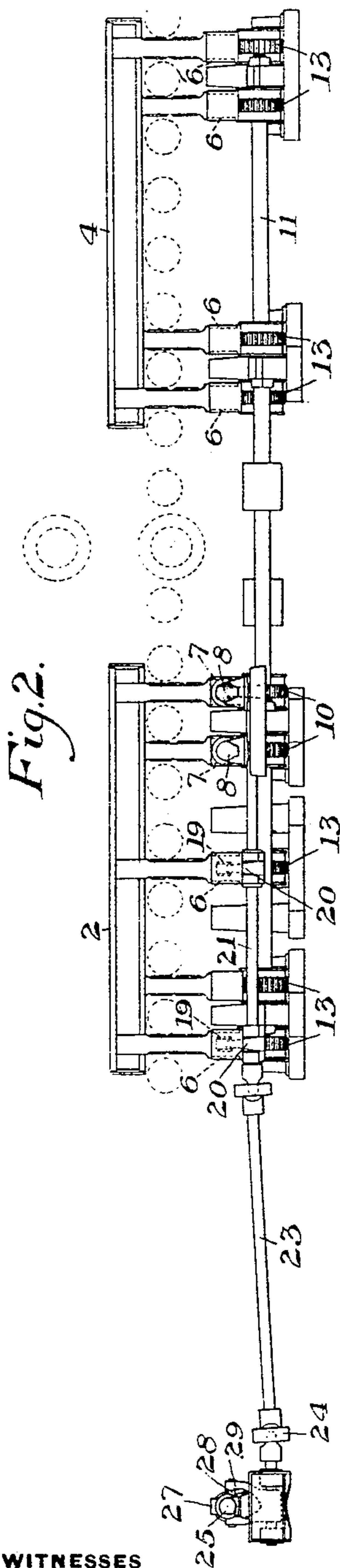


Fig. 2.

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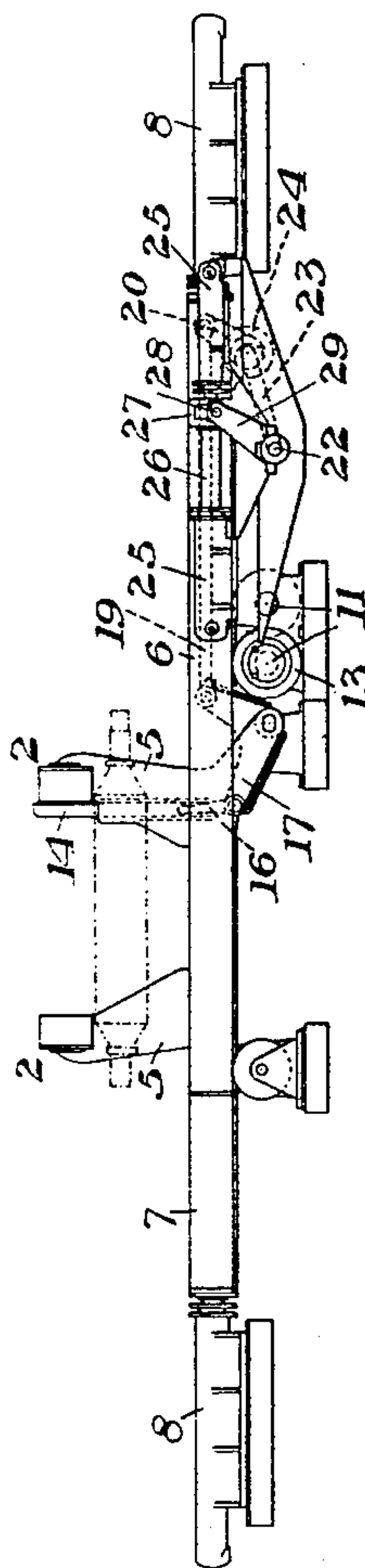


Fig. 3.

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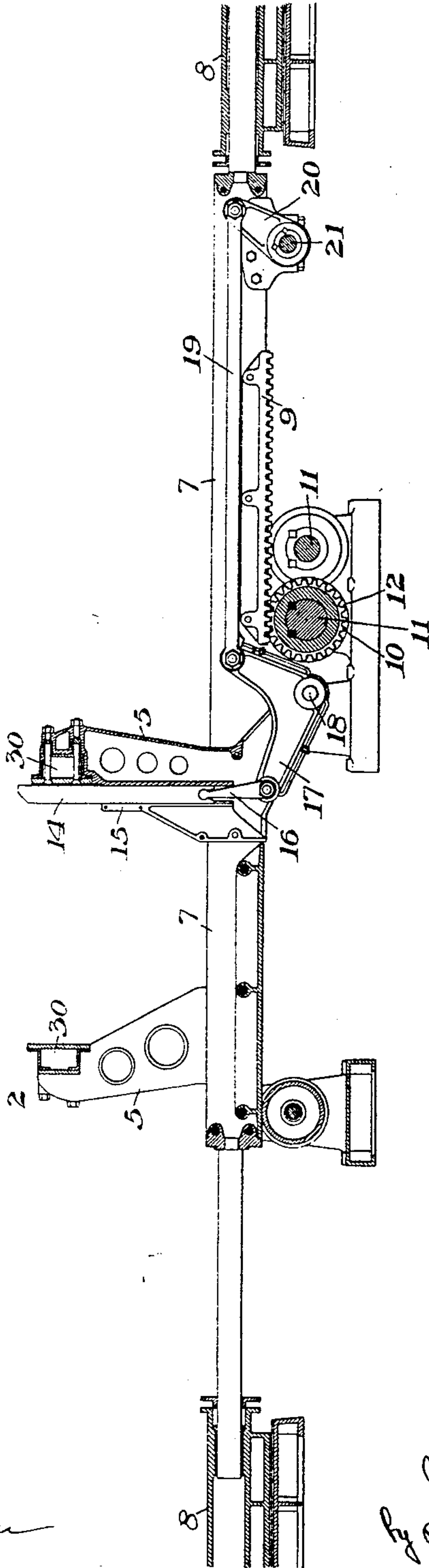
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Fig. 4.



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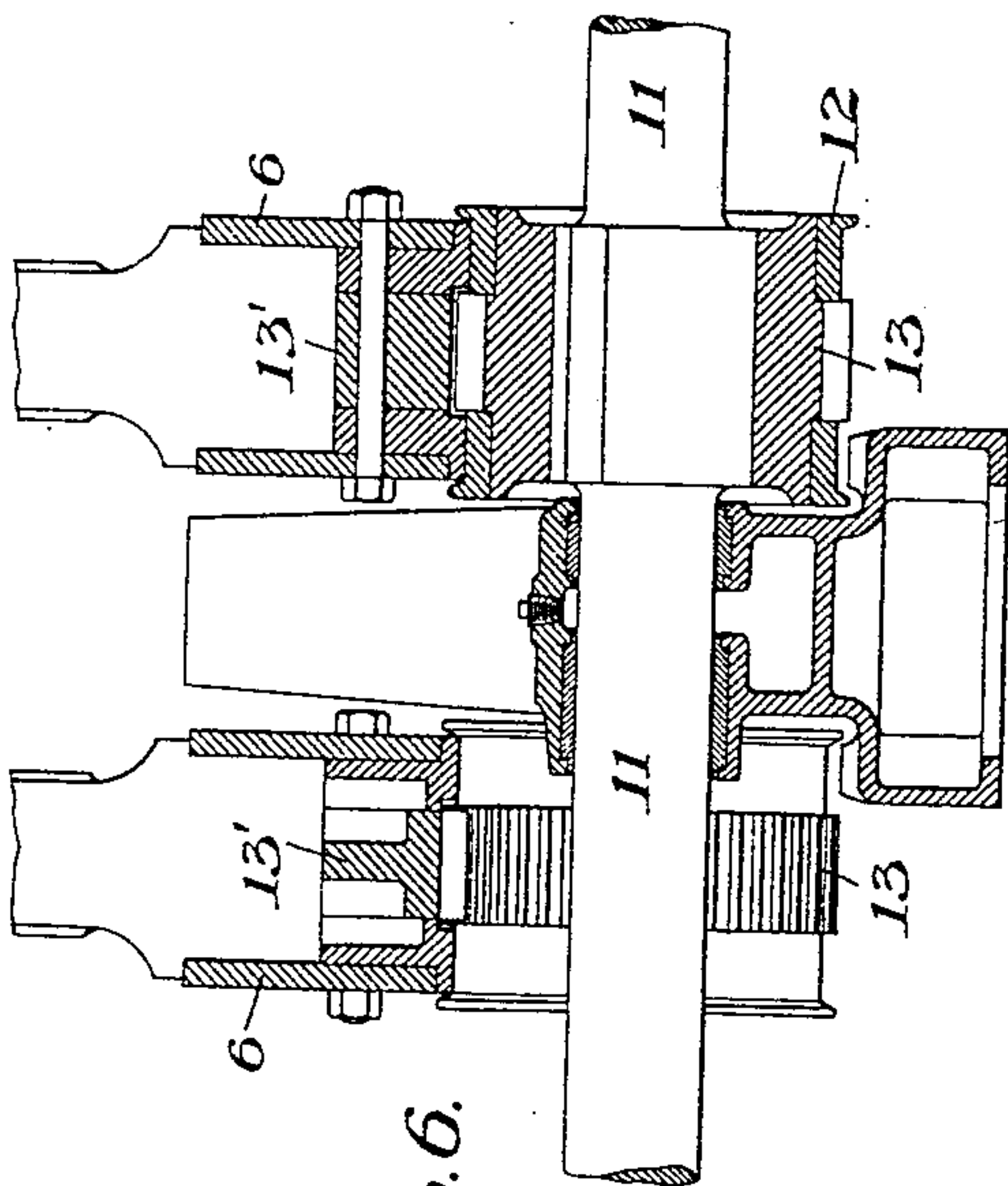


Fig. 6.

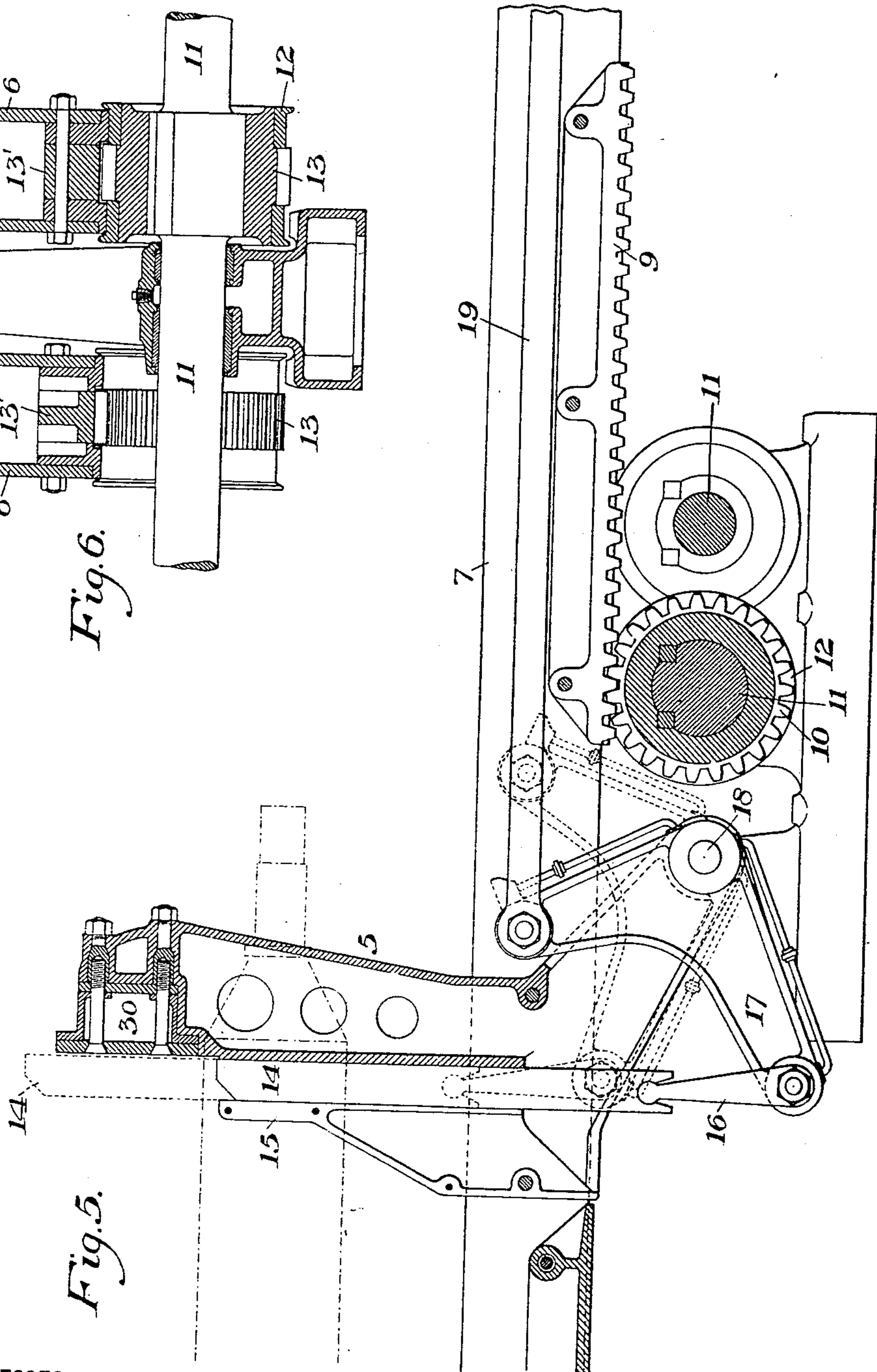


Fig. 5.

WITNESSES

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UNITED STATES PATENT OFFICE.

JULIAN KENNEDY, OF PITTSBURG, PENNSYLVANIA.

INGOT-MANIPULATOR.

No. 865,047.

Specification of Letters Patent.

Patented Sept. 3, 1907.

Application filed July 20, 1906. Serial No. 326,961.

To all whom it may concern:

Be it known that I, JULIAN KENNEDY, of Pittsburg, Allegheny county, 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—

Figure 1 is a plan view of an ingot manipulator and guide embodying my invention; Fig. 2 is a side elevation of the same; Fig. 3 is an end view; Fig. 4 is a section on the line IV—IV of Fig. 1; Fig. 5 is an enlarged detail sectional view of some of the parts and Fig. 6 is a detail view of parts hereinafter referred to.

My invention has relation to ingot manipulators and guides and is designed to provide means of simple, positive, and efficient character for the purpose of manipulating an ingot or bloom, in which the operating mechanism is arranged in an accessible position away from the mill and protected from roll scale, water and the like.

A further object is to provide novel and efficient means for effecting the simultaneous operation of the guides; also to provide means for cooling the guides.

Other objects and advantages of my invention will hereinafter appear.

In the drawings, the numeral 2 designates the laterally movable guides at one side of the mill 3, and 4 the similar guides at the opposite side of the mill. These guides are supported by the uprights 5 which are carried by the transversely movable bars or beams 6 and 7, the bars 7 being actuated by hydraulic cylinders 8, or other suitable motive devices.

Secured to each bar 7 is a rack bar 9 whose teeth engage the teeth of a pinion 10 on a longitudinally extending shaft 11. Two of these shafts 11 are employed in parallel relation, the pinion 10 upon one of them being engaged with the bar 7 which actuates the guides upon one side of the longitudinal center of the mill, and the pinion 10 from the other shaft 11 actuating the bar 7 for the guides at the opposite side of the longitudinal center of the mill. The pinions 10 are provided with the shrouds 12 which form roller bearing surfaces upon which rest the lateral portions of the beams 7 at each side of the racks 9. Each of shafts 11 is also provided with a series of similar pinions 13 which engage racks 13' on the bars 6 and which are also shrouded to form bearings for said bars in the same manner that the shrouds of the pinions 10 form bearings for the bars 7. The shafts 11 extend past the mill and carry the bars which actuate both sets of guides 2 and 4. In this manner, when the proper cylinder 8 is actuated the two guides upon the same side of the longitudinal center of the mill at opposite sides of the rolls are moved in unison, the pinions 13 constituting actuating means and also roller bearings for the bar 6.

14 designates vertically movable manipulator fingers

which work in guides 15, and which are actuated by links 16 connected thereto and to bell crank levers 17, fulcrumed at 18 on the bars or beams 6 and 7. The other arms of these bell crank levers are connected by rods 19 with crank arms 20 of a rock shaft 21 also journaled on the bars or beams 6 and 7. One end of the shaft 21 is connected to a short actuating shaft 22 by means of a spindle 23 which is connected to the shafts 21 and 22 by universal joints 24. The shaft 22 is actuated by means of two power cylinders 25 whose plungers are connected by a piston rod 26, having a slotted cross head 27 which engages an elongated crank pin 28 of a crank arm 29 of the shaft 22. The crank pin 28 is of sufficient length to permit the necessary endwise movement of the shaft 22 to accommodate the movement of the universally jointed spindle. The power cylinders 25 are located at one side of the manipulators in the direction of the line of feed of the mill.

The operation is as follows:—The guide bars 2 and 4 are moved to the desired position by the power cylinders 8 in a manner before described. The ingot or bloom is received between these bars upon the upper ends of the fingers 14. The cylinders 25 are then operated to actuate the piston-rod 26, thereby actuating shafts 22, 23 and 21. The shaft 21 in turn actuates the rod 19, bell crank 17 and links 16 to raise the fingers. These fingers catch the underside of the ingot or bloom at one side of its center and turn it into the desired position. The cylinders 25 are then reversely operated to withdraw the fingers, and the guide bars are manipulated by means of the cylinders 8 to bring the ingot or bloom into proper relation to the next roll pass.

The guide bars 2 and 4 are preferably made hollow to provide water chambers 30 through which water may be circulated for cooling purposes.

31 indicates water-circulating connections which may consist of flexible hose to permit of the necessary movement of the guides.

The advantages of my invention consist in the simplicity and positiveness of action of the means for moving the guide or manipulator bars; in the simplicity of the actuating mechanism for the manipulator fingers and in the location of the same away from the mill where it is accessible and protected from injury; and in the provision of means for cooling the guide or manipulator bars.

Various changes may be made in the details of construction and arrangement of the several parts without departing from the spirit and scope of my invention.

What I claim is:—

1. In an ingot manipulator, guide or manipulator bars, transversely movable carriers therefor, and power means for actuating said carriers, said power means including a shaft having a series of shrouded pinions which engage the carrier bars and also form roller carriers therefor; substantially as described.

2. An ingot manipulator having laterally movable ma-

nipulators and guides, a plurality of transversely movable carriers therefor having racks, shafts having shrouded pinions engaging the racks and forming bearings for the bars, and means for actuating said shafts; substantially as described.

3. An ingot manipulator having laterally movable guides or manipulators, bars or beams which carry the same, power means for actuating one bar of said manipulators, and a shaft having shrouded pinions thereon engaging the rack bars, and also forming roller supports for the carrier bars; substantially as described.

4. In an ingot manipulator, a movable guide or manipulator bar, a carrier therefor movable therewith, vertically movable manipulator fingers also movable with the bar and carrier, a rock shaft also journaled on the carrier, actuating connections between the fingers and the rock-shaft, a stationary motor, and an angularly movable driving connection between the motor and the rock-shaft; substantially as described.

5. In an ingot manipulator, the combination of a laterally movable guide or manipulator bar, a carrier movable therewith, vertically movable fingers also movable with the bar and carrier, actuating means connected with the carrier and fingers for moving the fingers vertically, a shaft extending transversely and journaled on the carrier and movable therewith, a connection between said actuating means and said shaft, a stationary motor located at one side of the carrier and a flexible driving connection between the motor and the said shaft; substantially as described.

6. An ingot manipulator having laterally and vertically movable manipulator fingers, mechanism movable laterally with the fingers for actuating said fingers, a stationary motive device for actuating the finger-actuating mechanism, and a flexible driving connection between the motive device and the laterally movable finger actuating mechanism; substantially as described.

7. An ingot manipulator having a laterally movable manipulator or guide bar, a carrier therefor, vertically movable manipulator fingers mounted therein, actuating mechanism for raising and lowering the fingers and movable with the carrier, a stationary motive device at one side of the carrier, and a flexible driving connection between the motive device and the actuating mechanism arranged to maintain the driving connection in all positions of the carrier; substantially as described.

8. In an ingot manipulator, a laterally-movable manipulator bar and carrier therefor, manipulator fingers mounted in guides thereon, actuating mechanism for the fingers mounted on the carrier, stationary power cylinders located at one side of the laterally movable carrier, and an endwise movable and flexible actuating connection between the cylinders and the said actuating connection; substantially as described.

In testimony whereof, I have hereunto set my hand.

JULIAN KENNEDY.

Witnesses:

JOHN MILLER,
H. M. CORWIN.