

E. J. McILVRIED.
MANIPULATOR.
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990,761.

Patented Apr. 25, 1911.

3 SHEETS—SHEET 1.

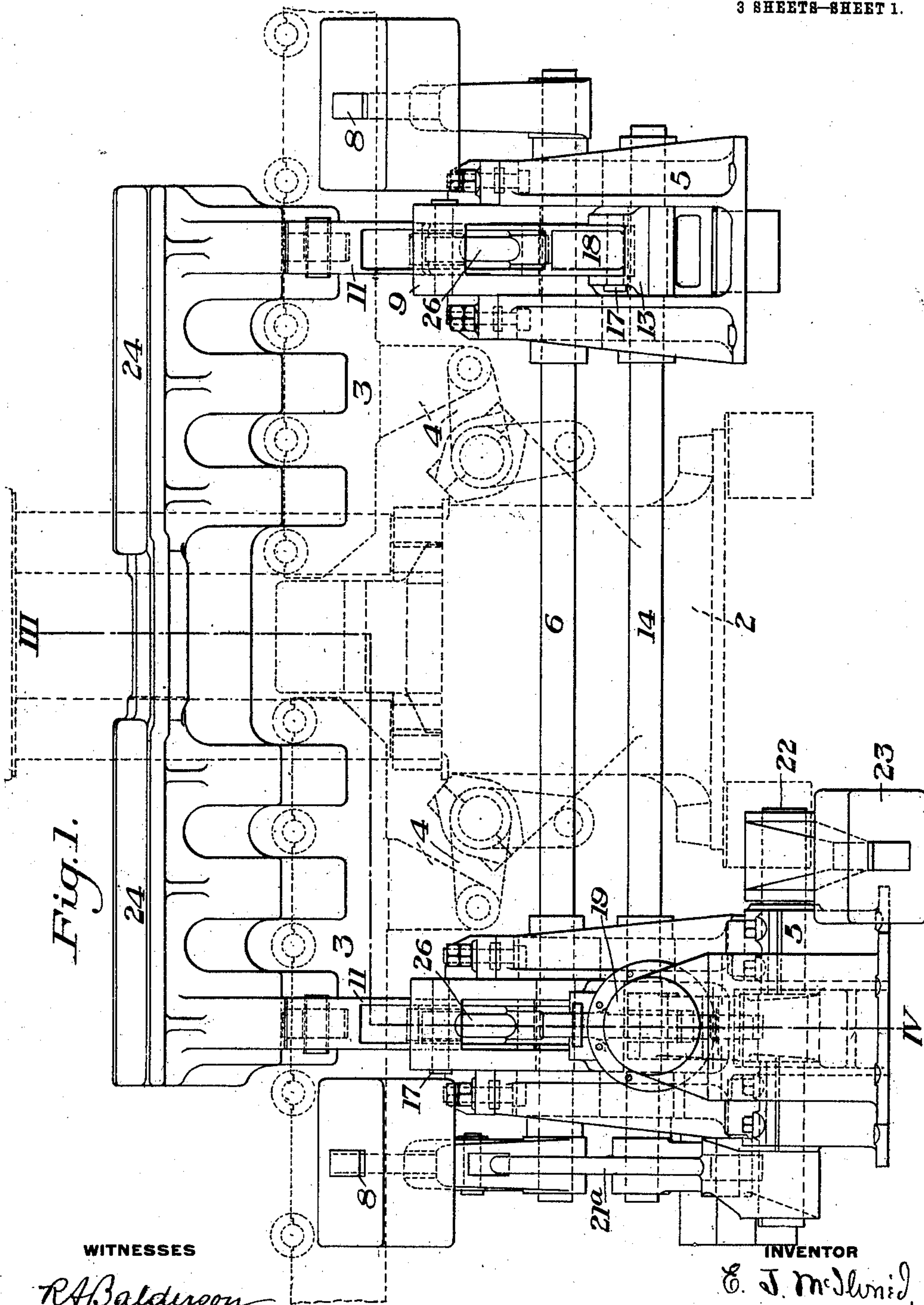


Fig. 1.

WITNESSES

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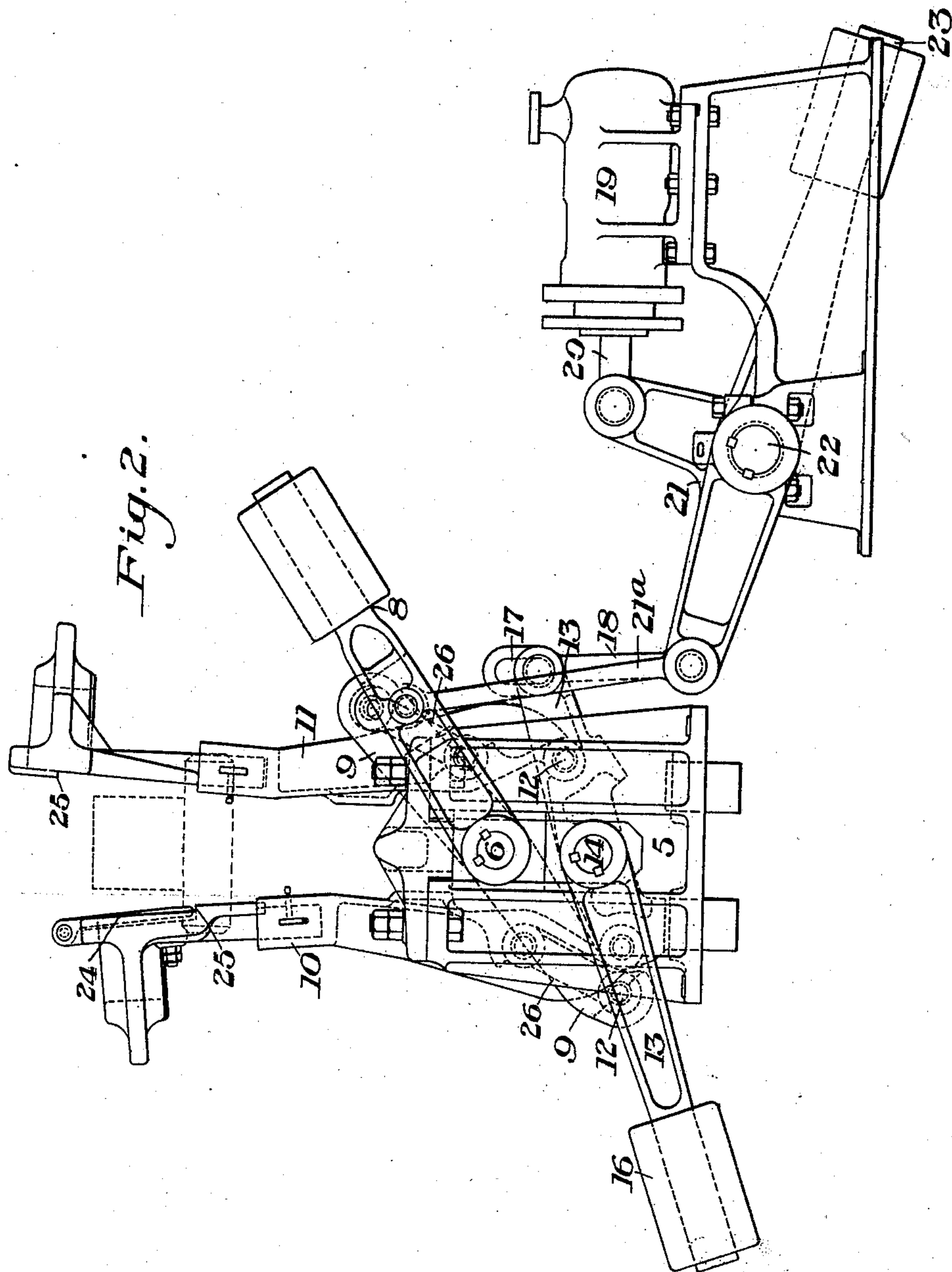
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3 SHEETS—SHEET 2.



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3 SHEETS—SHEET 3.

Fig. 4.

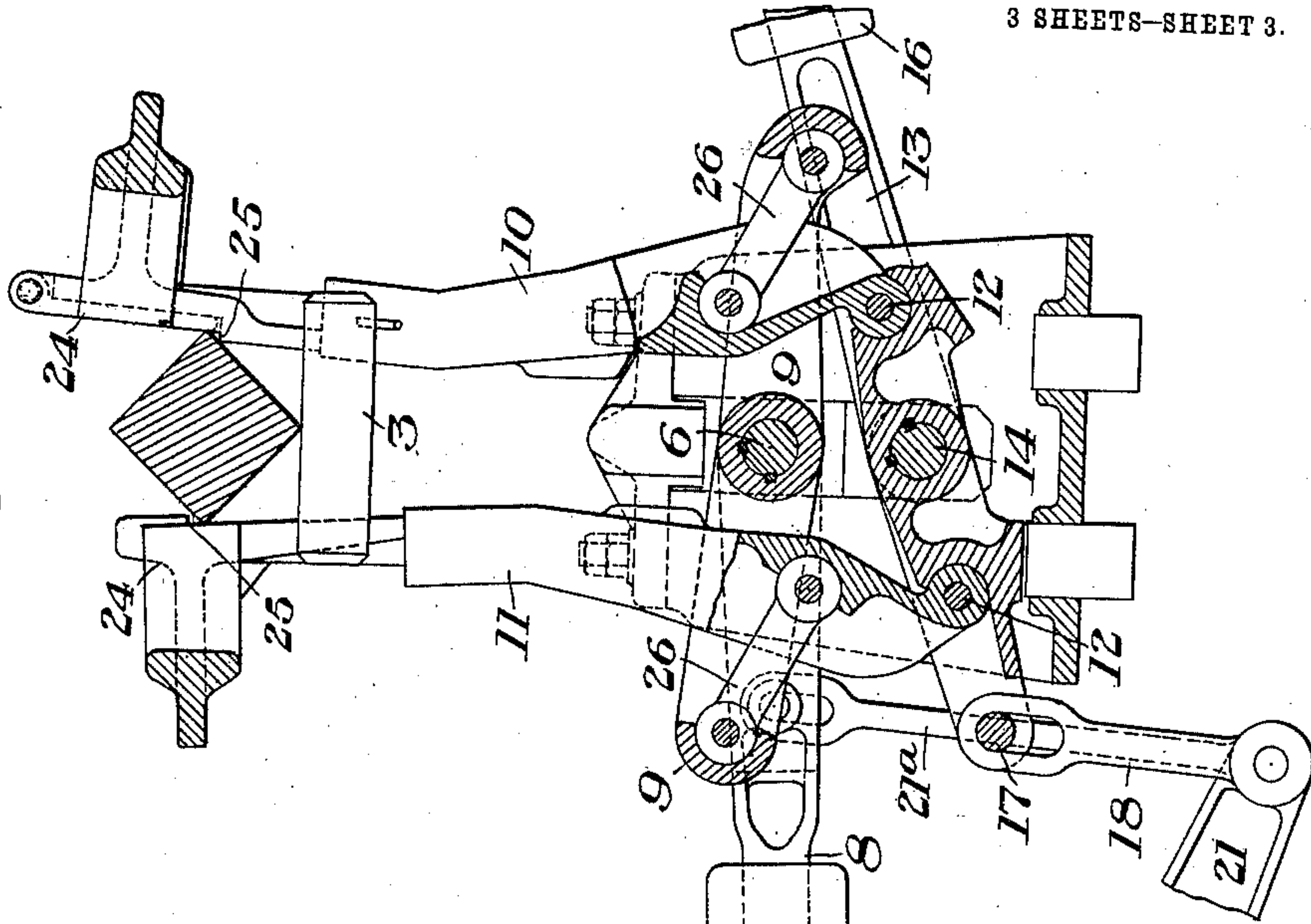
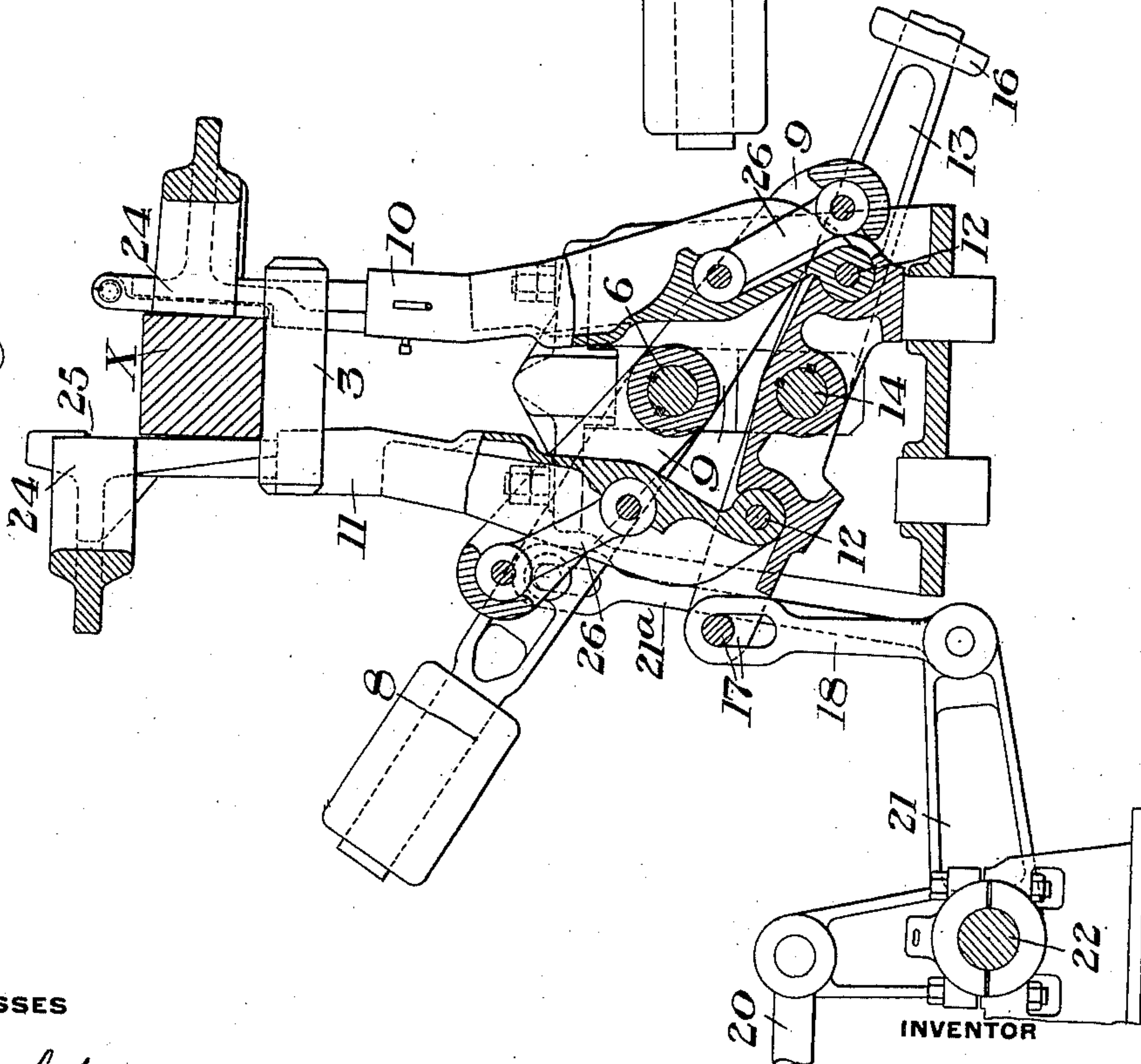


Fig. 3.



WITNESSES

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UNITED STATES PATENT OFFICE.

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MANIPULATOR.

990,761.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, EDWIN J. McILVRIED, a resident of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in 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 side view showing a manipulator embodying my invention applied to a forging press, the press and its tables being shown in dotted lines; Fig. 2 is an end view of the same; and Figs. 3 and 4 are sections taken on the irregular line III—IV of Fig. 1, and showing the parts in different positions and also illustrating their action in turning a billet.

My invention has relation to manipulators for billets, blooms and other metal shapes, and is applicable for forging presses, rolling mills, or other apparatus where it is desired to edge or turn a billet or other metal shape and put it in line with a working pass of the apparatus.

The object of my invention is to provide a manipulator which will be simple and positive in its action and which will not only turn or edge the billet or other metal shape, but will also put it in line with the roll pass.

The nature of my invention will be best understood by reference to the accompanying drawings, in which I have illustrated the preferred embodiment thereof and which will now be described, it being premised, however, that various changes may be made in the details of construction and arrangement of the parts, without departing from the spirit and scope of my invention, as defined in the appended claims.

In Fig. 1 of the accompanying drawings, I have illustrated my invention as adapted for use in connection with a forging press, having vertically movable tables, but it will be understood that my invention is not limited to such use, but may be used for a variety of purposes. In this figure, the numeral 2 designates the base of the forging press, 3 the vertically movable roll tables

at opposite sides thereof, and 4 indicates portions of suitable table-raising and lowering devices, which form no part of my present invention. These parts are shown in dotted lines.

5 designates supporting frames of any suitable character, which are placed at opposite sides of the press 2, and which are provided with bearings for the longitudinal rock shaft 6. Rigidly secured to each end portion of the rock shaft 6 is a counterweighted lever arm 8, and also keyed to each end portion of said shaft is a lever 9.

10 and 11 designate two vertically extending arms, one pair of these arms being provided at each side of the press 2. Each pair of these arms is pivoted at its lower end by a pin or pivot connection 12, to a lever 13, which is secured intermediate of its ends to a longitudinal rock shaft 14, extending parallel to the rock shaft 6, and the lever having a counterweight 16. One end of the lever 13 has a lost motion pin and slot connection 17 with a link 18, whose opposite end is connected to suitable actuating mechanism. This actuating mechanism is shown as consisting of a single-acting power cylinder 19, preferably a hydraulic cylinder, whose piston rod 20 is connected to one arm of a bell crank 21, the other arm of the bell crank being connected to the link 18, and the shaft 22, to which the bell crank is secured, having a counterweighted arm 23. The bell crank lever 21 is also connected by a link 21^a with one of the counterweighted levers 8.

The arms 10 and 11 at the two sides of the press 2 are each connected by the longitudinally extending manipulator plates or jaws 24. The inner faces of these plates or jaws may be provided with any suitable form of friction surface, for engagement with the metal shape to be turned, or they may be, as shown in the drawings, provided simply with shoulders 25, the shoulders on the opposite jaws being at different heights, so that the shoulder on one jaw will engage the one lower corner of the shape to be turned, while the shoulder on the other jaw will engage the diagonally opposite corner thereof.

Each of the arms 10 and 11 is connected with the lever 9 at opposite sides of the rock shaft 6 by a link or toggle 26.

The operation is as follows: The counter-
 5 weighted levers 8 by their action on the levers 9, and through said levers on the links or toggles 26, normally tend to bring the two pair of arms 10 and 11 toward each other, but this is prevented by the link 21^a,
 10 which is normally upholding the lever 8 and preventing its counterweight from acting to its full extent. When power is admitted to the right hand end of the cylinder 19, looking at Fig. 2, the piston rod 20
 15 is forced outwardly, and thereby rocks the bell crank 21 to cause a downward pull on the links 18 and 21^a. By means of the lost motion connection 17, the bell crank 21 will have a part of its movement without any
 20 effect upon the lever 13, but will immediately release the counterweighted lever 8, so that its counterweight can gradually act to thereby move the arms 10 and 11 toward each other bringing the inner faces of the
 25 manipulator plates or jaws into contact with the opposite sides of the metal shape, as shown in Fig. 3. After the jaws or plates have been brought into this position, the movement of the bell crank lever has taken
 30 up the lost motion permitted at the connection 17, and further movement of the bell crank lever moves the lever 13 and raises the counterweight 16. This movement of the lever 13, as will be readily seen
 35 on Figs. 2, 3, and 4, will, by reason of the connections of the arms 10 and 11 to said lever at opposite sides of its axis, cause the arms 10 to move upwardly, while the arms 11 are given a corresponding movement
 40 downwardly. This causes the frictional faces of the manipulator jaws or plates, or, in the form shown, the shoulders 25, to engage diagonally opposite corners of the billet X, and exert a turning action thereon, illustrated in Fig. 4. During this turning move-
 45 ment, the counterweighted lever 8 continues to act upon the arms 10 and 11, holding them in contact with the billet and keeping the billet centered with respect to the pass of the press or the mill. As soon as the billet
 50 has been turned, the pressure is released from the cylinder 19 and the counterweighted lever 23, together with the counterweight 16 on the lever 13, return the parts
 55 to their normal position, the counterweight 8 being raised again to the position shown in Fig. 2.

It will be readily understood that in applying the manipulator to a rolling mill, the
 60 two sets of arms 10 and 11 might be arranged at the same side of the mill, or that for a short manipulator, but one set of these arms will be required.

The advantages of the invention will be

readily appreciated since it provides an ex- 65
 tremely simple and effective means for turning a metal shape and this shape may be either rectangular, round or irregular, the manipulator jaws or plates in any case exerting an effective turning or rotating action 70
 thereon.

I claim:

1. A manipulator comprising a pair of plates or jaws adapted to grasp a metal 75
 shape between them, and actuating connections for effecting a lateral and also a reverse vertical movement of the jaws, substantially as described.

2. A manipulator comprising a pair of pivoted jaws arranged to grasp a metal 80
 shape between them, connections for simultaneously moving one of said jaws upwardly and the other downwardly while in contact with opposite sides of the metal shape, and means for effecting a lateral movement of 85
 the jaws, substantially as described.

3. A manipulator comprising a pair of jaws or plates adapted to grasp a metal 90
 shape between them, vertically extending arms carrying the plates or jaws, a pivoted lever to which said arms are connected at their lower ends at opposite sides of the lever fulcrum, power means for actuating said 95
 lever, and actuating connections for effecting the lateral movement of said arms and jaws toward and away from each other, substantially as described.

4. A manipulator comprising a pair of manipulator plates or jaws adapted to 100
 grasp a metal shape between them, vertically extending arms carrying the jaws or plates, a lever to which the lower ends of said arms are pivotally connected at opposite sides of the lever fulcrum, power means connected 105
 to said lever for oscillating the same, and a weighted lever also connected with the power means and having link connections with the said arms, substantially as described.

5. A manipulator comprising a pair of 110
 manipulator plates or jaws adapted to grasp a metal shape between them, vertically extending arms carrying the jaws or plates, a lever to which the lower ends of said arms are pivotally connected at opposite sides of 115
 the lever fulcrum, power means connected to said lever for oscillating the same, a weighted lever also connected with the power means and having link connections with the said arms, and a connection be- 120
 tween the first named lever and the power means having a lost motion, substantially as described.

6. A manipulator comprising oppositely 125
 arranged manipulator plates or jaws arranged to grasp a metal shape between them, a pivoted lever to which said jaws are connected at opposite sides of the lever pivot, a

power cylinder having a main connection
with said lever, a pivoted member having a
link connection with said jaws at opposite
sides of its pivotal axis, and a weight con-
5 nected to the pivoted member, together with
connections between the power means and
the weight and arranged to hold the weight
in raised position, substantially as described.

In testimony whereof, I have hereunto set
my hand.

EDWIN J. McILVRIED.

Witnesses:

GEO. H. PARMELEE,
H. M. CORWIN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."
