D. L. MEKEEL.

INGOT MANIPULATOR.

APPLICATION FILED MAR. 16, 1908.

899,832.

Patented Sept. 29, 1908.

3 SHEETS—SHEET 1.

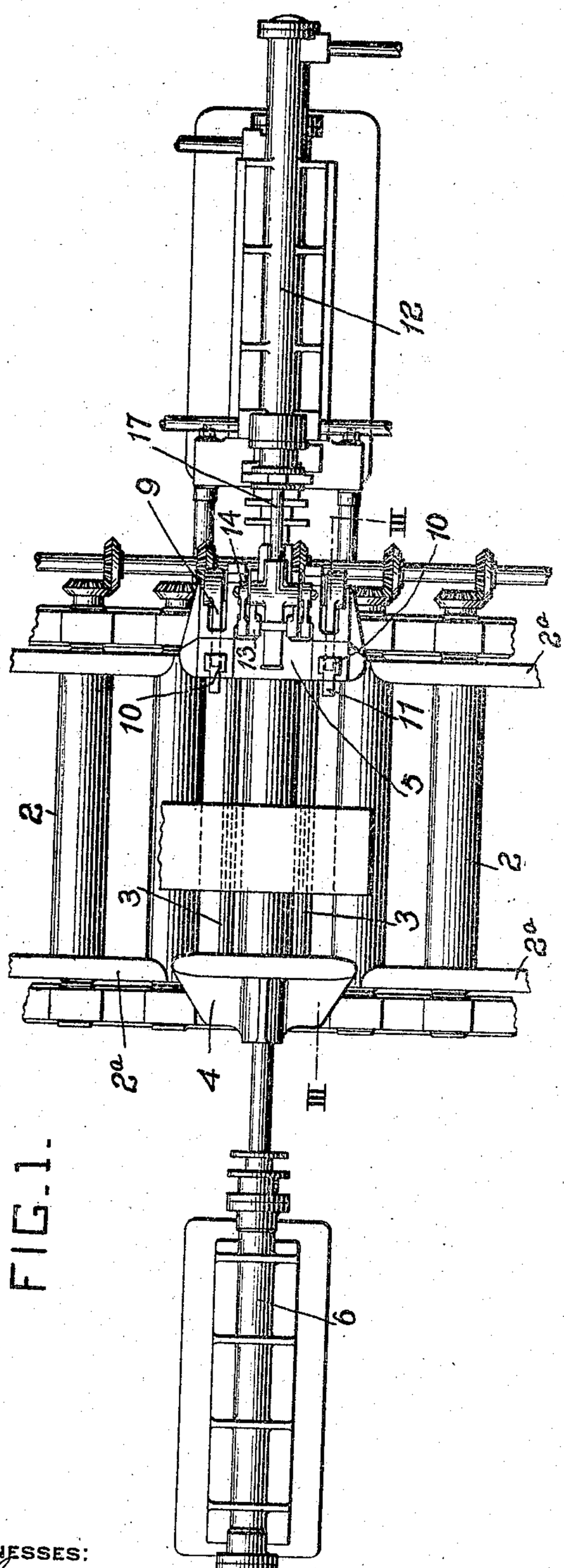

FIG. 1.

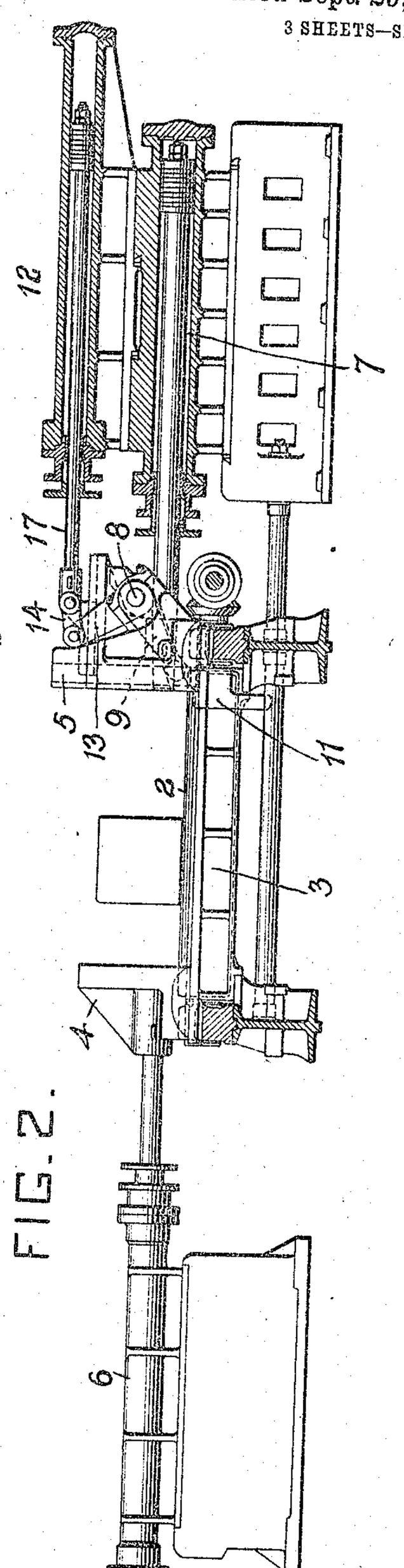

FIG. 2.

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3 SHEETS—SHEET 2.

FIG. 3.

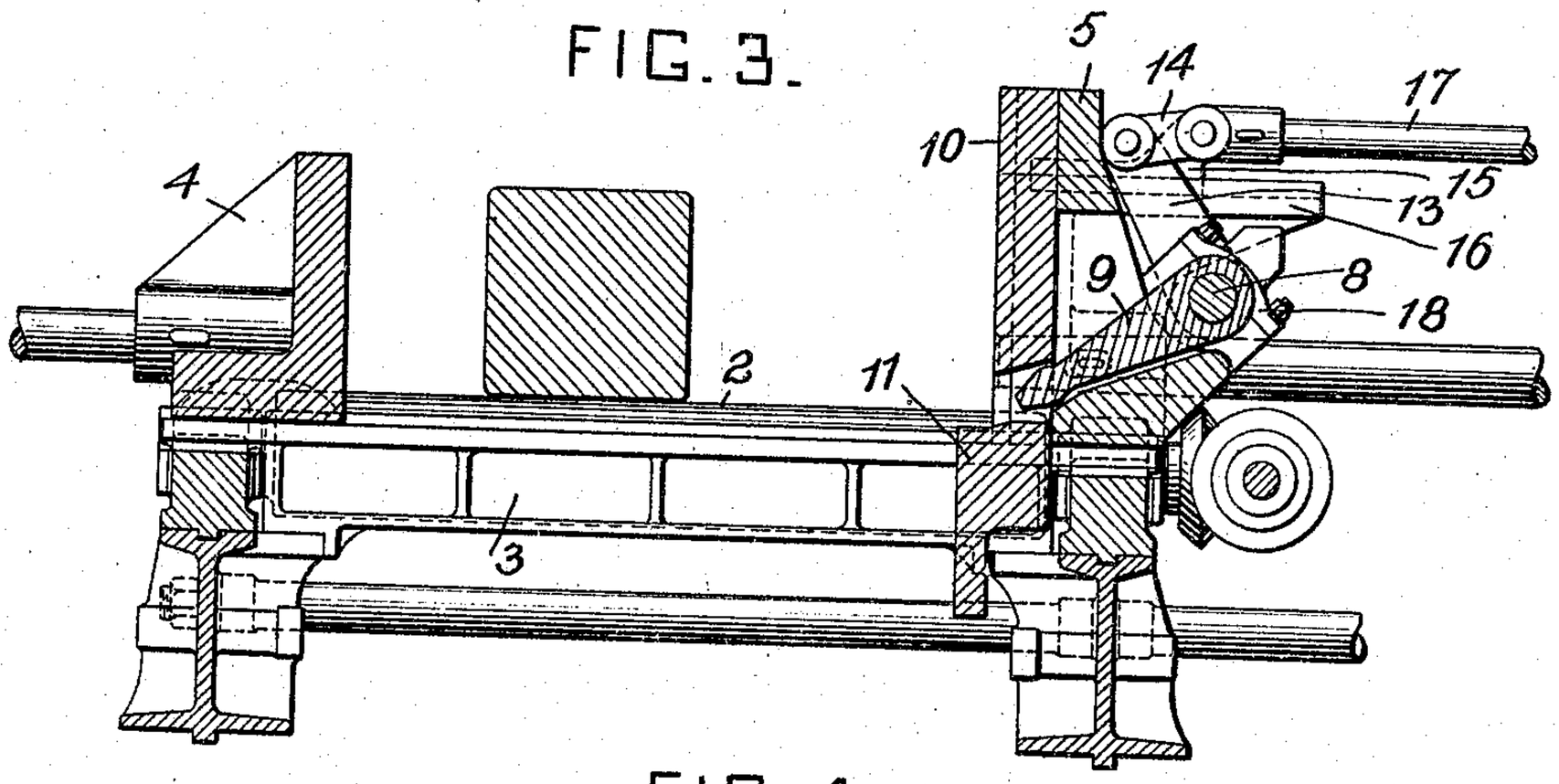


FIG. 4.

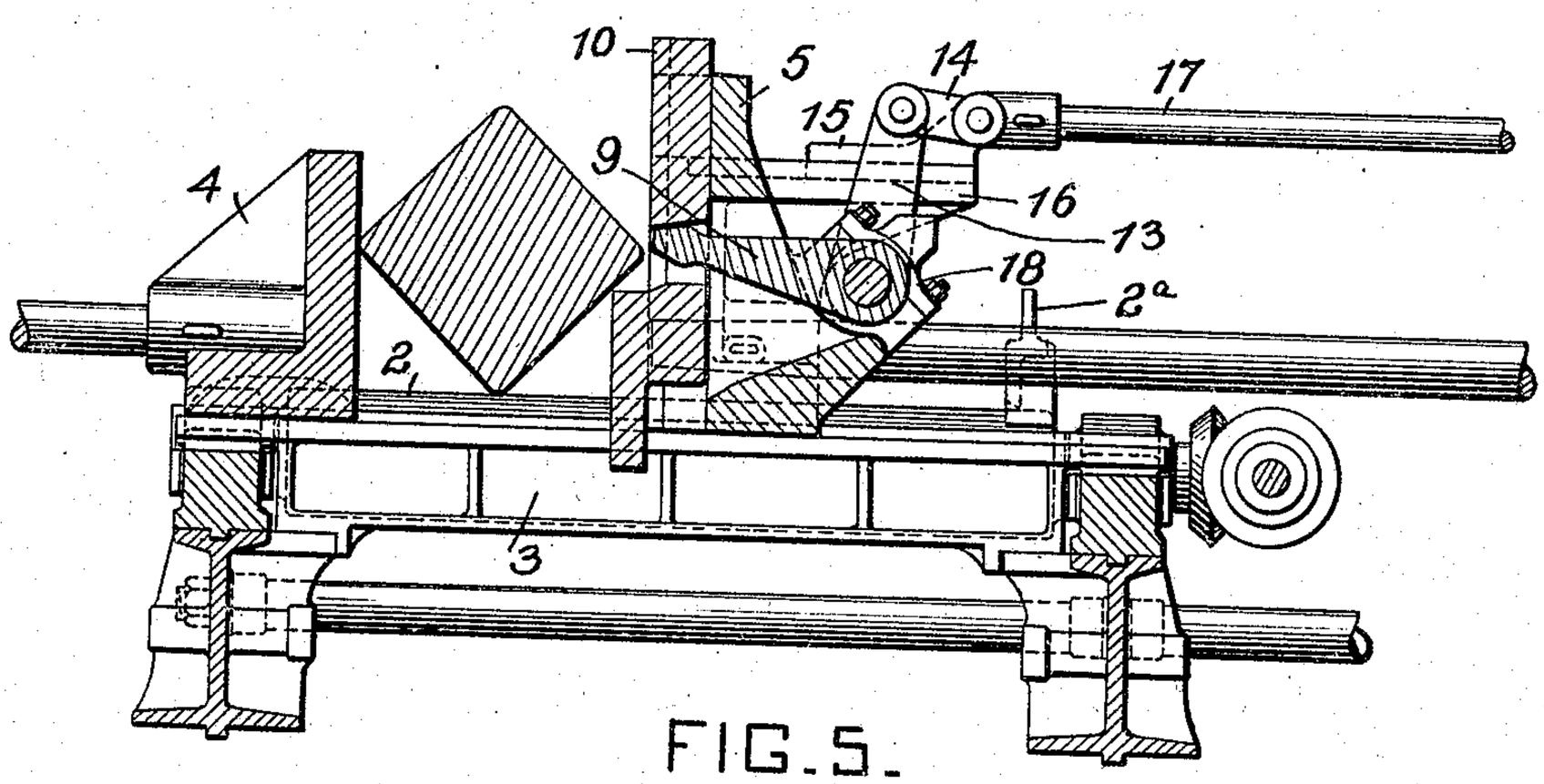
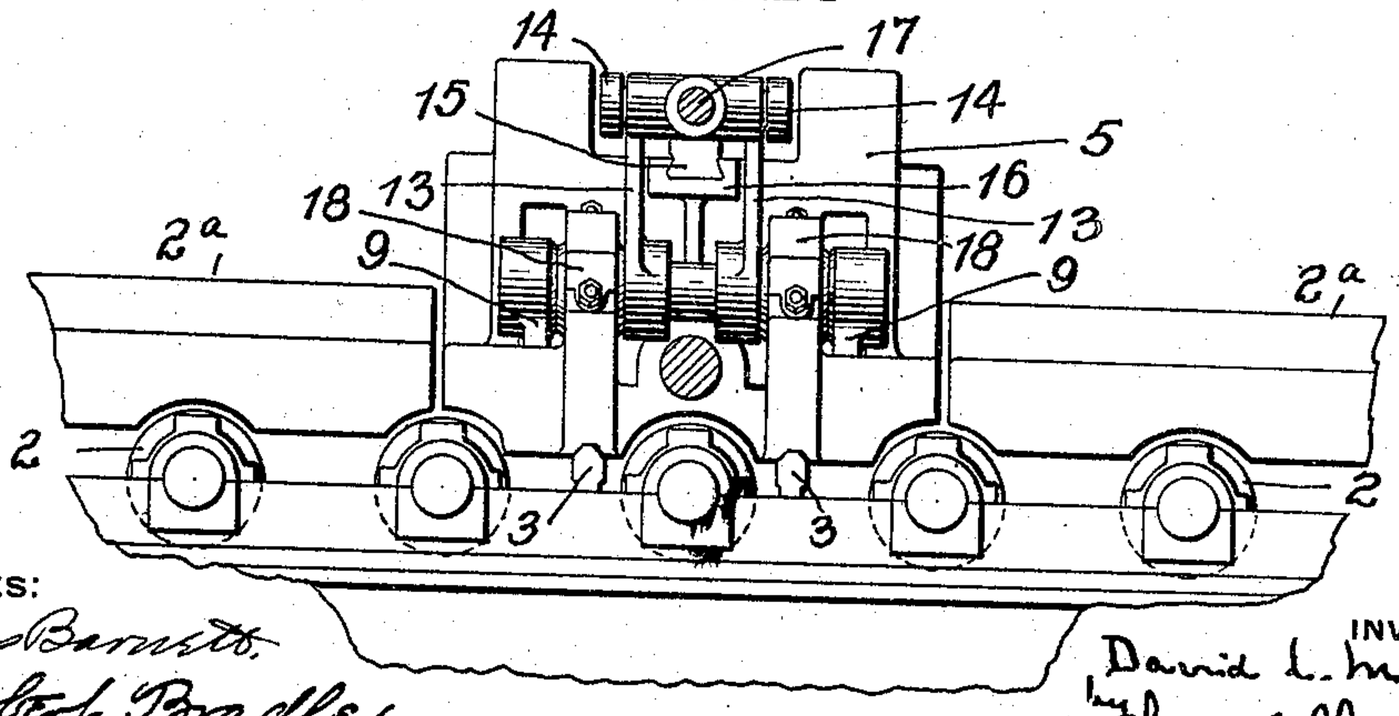


FIG. 5.



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3 SHEETS—SHEET 3.

FIG. 6.

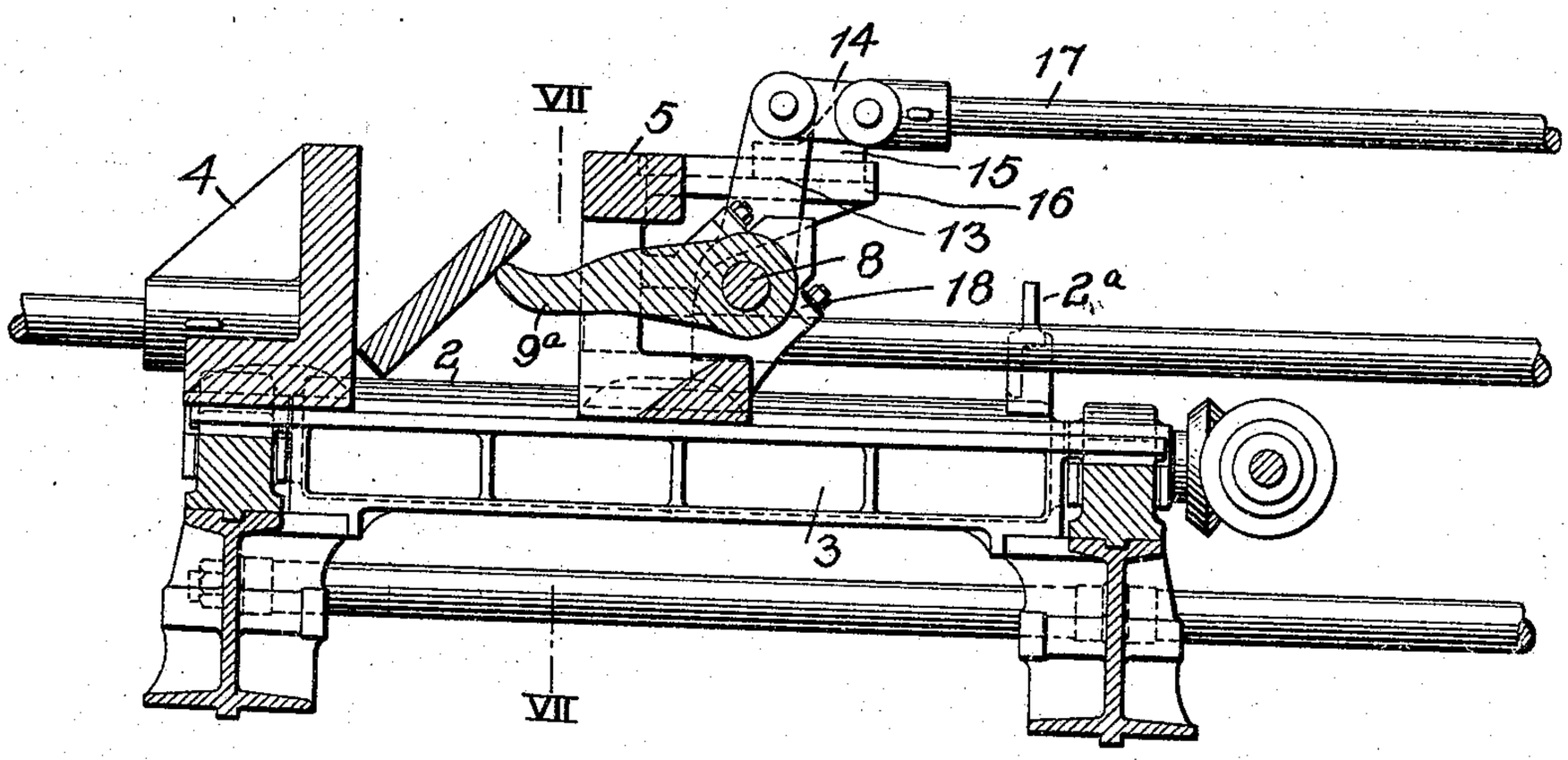
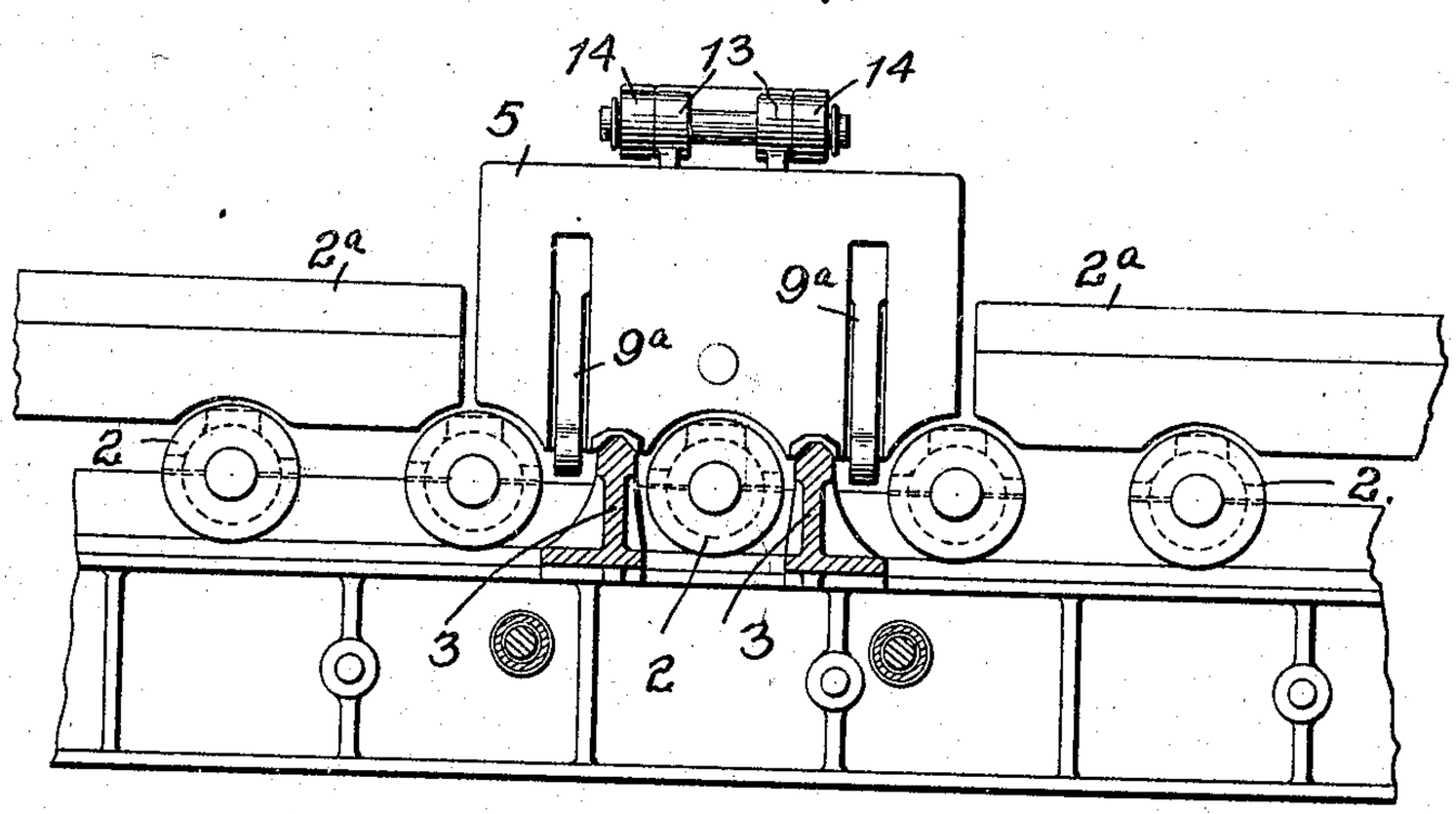


FIG. 7.



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UNITED STATES PATENT OFFICE.

DAVID L. MEKEEL, OF SEWICKLEY, PENNSYLVANIA.

INGOT-MANIPULATOR.

No. 899,832. Specification of Letters Patent. Patented Sept. 29, 1908.

Application filed March 16, 1908. Serial No. 421,488.

To all whom it may concern:

Be it known that I, DAVID L. MEKEEL, residing at Sewickley, in the county of Allegheny and State of Pennsylvania, a citizen of the United States, have invented or discovered a certain new and useful Improvement in Ingot-Manipulators, of which improvement the following is a specification.

The invention described herein relates to certain improvements in mechanism for turning ingots, slabs, etc., on their axis during the rolling operation, and for retaining such pieces, when necessary, in the position to which they have been turned.

The invention is hereinafter more fully described and claimed.

In the accompanying drawings forming a part of this specification Figure 1 is a top plan view showing the portion of the feed table of the rolling mill having my improved manipulator applied thereto; Fig. 2 is a view partly in section and partly in elevation of the mechanism shown in Fig. 1; Fig. 3 is a sectional view on an enlarged scale, the plane of section being indicated by the line III—III Fig. 1, and the motor being omitted; Fig. 4 is a view similar to Fig. 3, showing the parts of the manipulator in turning an ingot; Fig. 5 is an elevation looking at the outer side of one of the manipulator elements; Fig. 6 is a view similar to Fig. 4 illustrating a modification of my improvement and Fig. 7 is a sectional elevation on a plane indicated by the line VII—VII Fig. 6.

In the practice of my invention the rolling mill table is of the usual and any suitable construction, and provided with feed rollers 2 preferably positively driven to feed the ingot to the rolls (not shown) and side or guide plates 2^a. Rails 3 extend transversely of the table between rollers, their ends being supported in the side frames of the table. These rails support heads or abutments 4 and 5 adapted to slide along the rails transversely of the table, in turning or shifting an ingot, slab, etc. One of these heads or abutments as 4, which for convenience I will term the holding abutment, is connected to a suitable motor, whereby it may be reciprocated, such for example as the fluid pressure cylinder 6. The other head or abutment 5 is connected to a fluid pressure cylinder 7 on the opposite side of the feed table. These heads or abutments are withdrawn into gaps or openings in the side rails except when operating on the article being rolled. As is the usual practice, the valves controlling the flow of fluid pressure to and from these cylinders, are located at a convenient point where each can be operated in turn or simultaneously as required by the work to be performed.

A rock shaft 8 is mounted on the head 5 and has keyed thereto turning arms 9 which may operate either directly or through slides 10 to turn the ingot, slab, or other article. The slides when employed are arranged in guide grooves formed in the inner face of the head as shown in Figs. 1 to 5, and are provided with lugs or projections 11 extending beyond the face of the head or abutment. The slides are provided with slots or openings for the reception of the ends of the turning arms 8.

The rock shaft is operatively connected to a suitable motor as the fluid pressure cylinder 12, in any suitable manner. The connection shown consists of an arm 13 on the rock shaft connected by a link 14 to a slide 15 supported on guides 16 on the head or abutment 5 and connected to the piston rod 17 of the cylinder 12. The bearings for the rock shaft 8 have removable caps 18, so that by removing such caps and disconnecting the arm 13 from the slide the shaft and arms 9 can be easily withdrawn and the slide 10 removed, and new parts inserted. The lugs or projections 11 of the slides are so located that when the latter are in their lower or inoperative position the lugs or projections will be below the line of movement of an ingot or slab resting upon the rollers.

When it is desired to run an ingot or slab, the head or abutment 5 is moved in towards the ingot or slab until the lugs 11 are under one edge of such ingot or slab. The slide is then raised the lugs 11 engaging the ingot or slab near one edge and turning the slab as indicated in Fig. 4. In order to prevent the ingot or slab sliding off of the lugs or projections, the holding head or abutment is moved up against the ingot or in such relation thereto as to prevent the lateral sliding of the ingot, but not to interfere with the turning movement. In order to insure the lugs following up and maintaining contact with the ingot or slab in turning, the head or abutment is gradually moved inwards as the turning progresses, or the same purpose may be attained by moving in the holding head or abutment 4. It will be observed that the lugs 11 extend down vertically from the

points or corners engaging the ingot in the turning operation, and afford bearing surfaces of considerable area to support the ingot or slab in its turned position. The supporting function may however be effected by the face of the head or abutment itself after the slab or ingot has been turned through a sufficient angle to permit the completion of the turning being effected by the abutment itself. In such case the lugs would be dropped down and the ingot or slab held in position by the faces of the two abutments or heads.

In the construction shown in Fig. 6 and 7 the arms 9^a on the turning shaft 8, are made of sufficient length to operate directly to turn the ingot, slab, etc. In such case the slides 10 are omitted.

It is characteristic of my improvement that the turning arms are mounted on the head or abutment and move back and forth therewith being brought into operative relation to the slab or ingot by the movement of the head. In turning an ingot the head 5 is moved in adjacent to the ingot by the admission of fluid pressure into the cylinder 7. At the same time fluid pressure is also admitted to the cylinder 12, so that its piston will move at the same rate as the head 5, as otherwise the movement of the head would tend to turn the shaft 8 and its arms 9 or 9^a. As soon as the head 5 is in proper proximity to the ingot or slab, the turning arms are moved. This movement can be effected by arresting the movement of the piston of cylinder 12 while the head continues to move toward the ingot, thereby causing a lifting of the arms and consequent turning of the ingot. Or the movement of the head can be arrested and fluid pressure admitted to the opposite end of cylinder 12 to raise the arms.

It is characteristic of my improved construction that the manipulator, including the head or abutment, the turning fingers and their operating mechanism, are located above the plane of the rollers of the feed table, and hence are readily accessible for repairs, and are not liable to be injured by scale, etc. dropping from the articles being rolled.

I claim herein as my invention:

1. The combination with a feed table, of a head or abutment, means for moving said head transversely of the table, vertically movable turning arms carried by the head, a rock shaft mounted on the head above the plane of the rollers and connected to the turning arms, and means for shifting the rock shaft.

2. The combination of a feed table, of a head or abutment, means for shifting said head or abutment transversely of the table, slides mounted in said head and provided with lugs or fingers projecting beyond the face of the head, a rock shaft mounted on the head above the plane of the rollers of the feed table and provided with arms connected to the slides above the lugs or fingers, and means for oscillating the rock shaft.

3. The combination of a feed table, of a head or abutment, means for shifting the head or abutment transversely of the table, slides mounted in said head or abutment and provided with fingers or lugs projecting beyond the face of the head, a rock shaft provided with arms engaging slots in the slides, bearings on the abutment for the rock shaft and provided with removable caps and means for oscillating the rock shaft detachably connected thereto.

In testimony whereof, I have hereunto set my hand.

DAVID L. MEKEEL.

Witnesses:

CHARLES BARNETT,

FRANCIS J. TOMASSON.