

980,216

R. F. DEVINE.
 APPARATUS FOR HANDLING FORGINGS.
 APPLICATION FILED DEC. 16, 1908.

Patented Jan. 3, 1911.

4 SHEETS—SHEET 1.

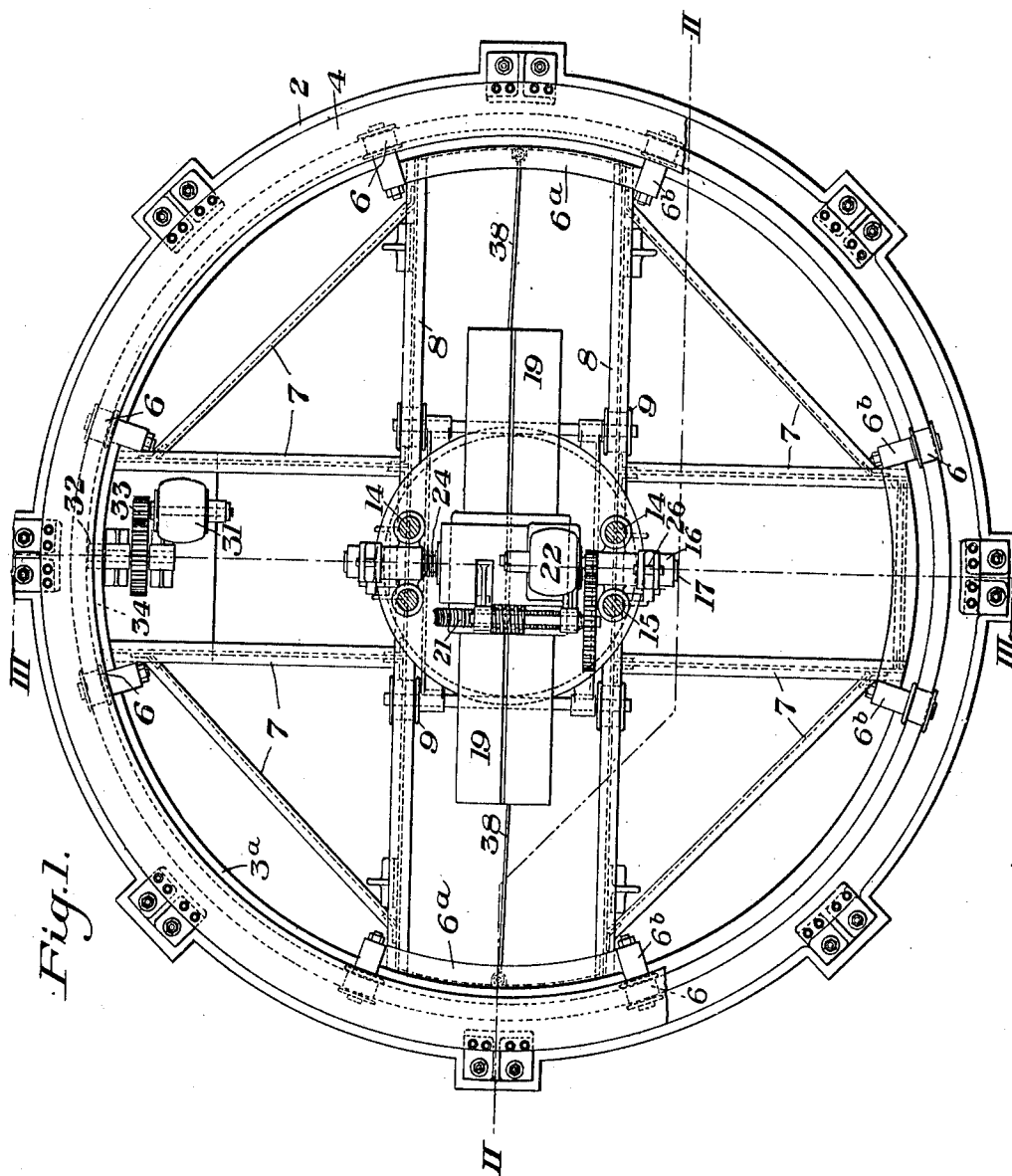


Fig. 1.

WITNESSES

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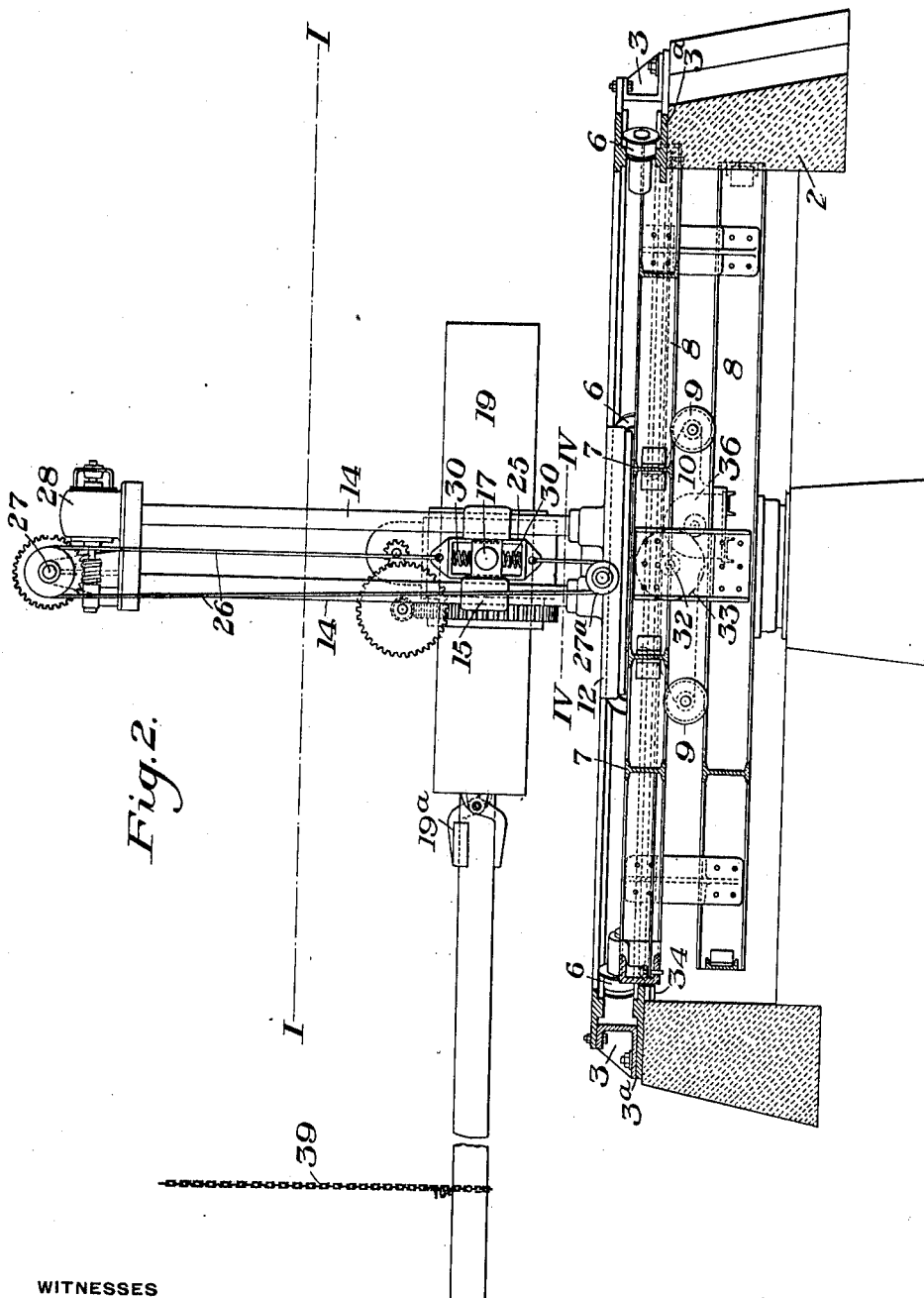
INVENTOR

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 by Baker, Rogers & Parnell,
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 4 SHEETS-SHEET 2.



WITNESSES

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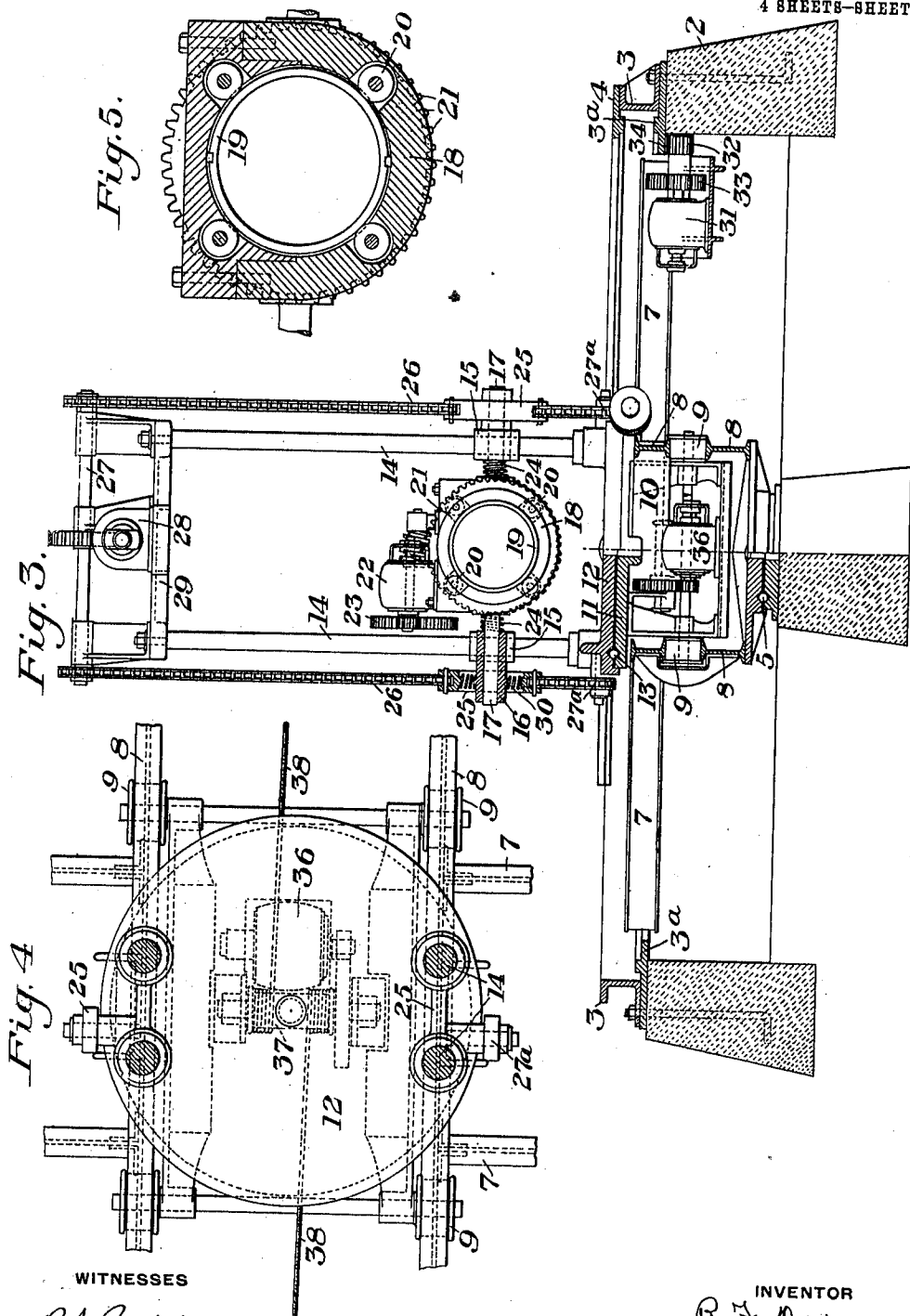
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4 SHEETS—SHEET 3.



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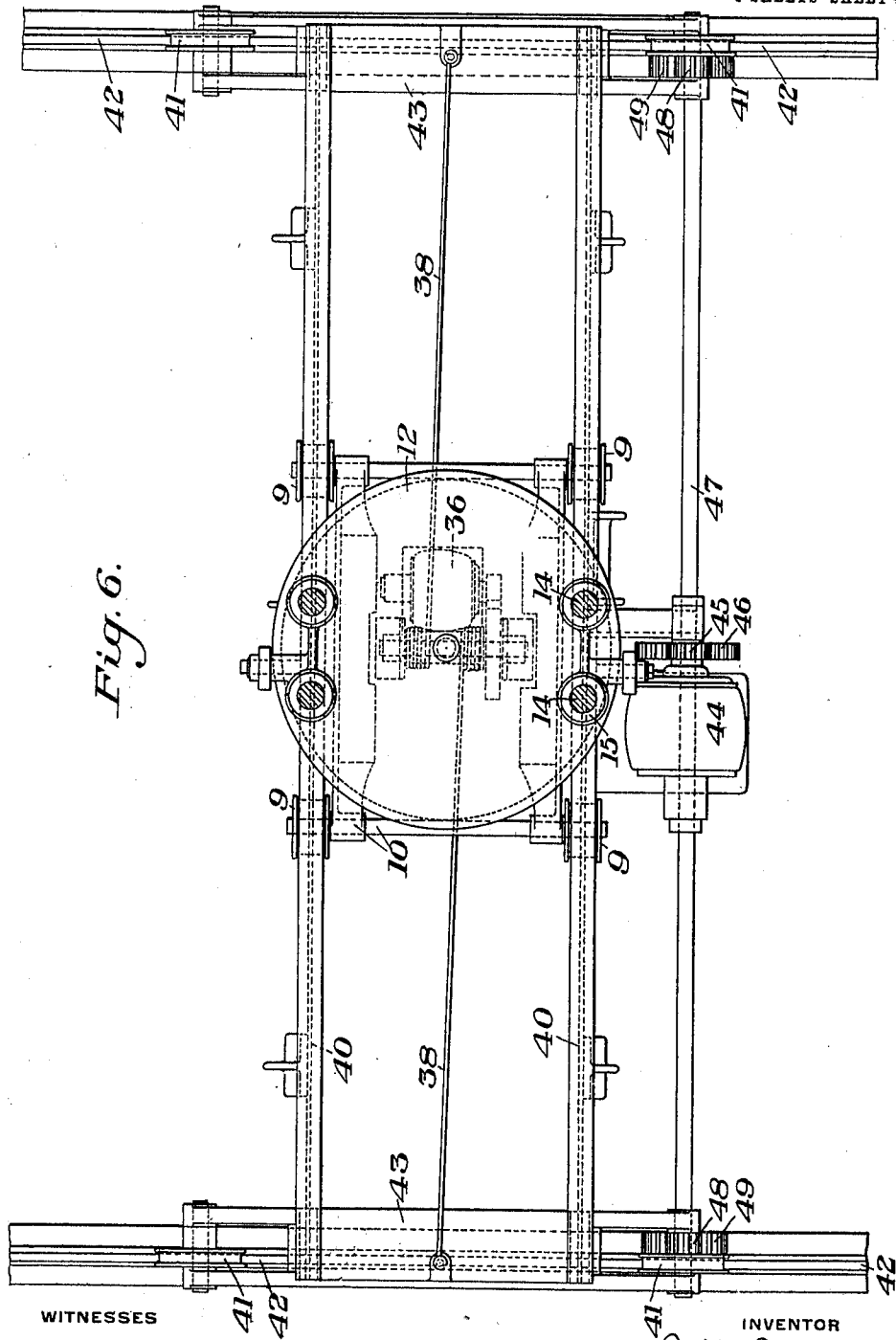


Fig. 6.

WITNESSES

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UNITED STATES PATENT OFFICE.

ROBERT F. DEVINE, OF ERIE, PENNSYLVANIA.

APPARATUS FOR HANDLING FORGINGS.

980,216.

Specification of Letters Patent.

Patented Jan. 3, 1911.

Application filed December 16, 1908. Serial No. 467,792.

To all whom it may concern:

Be it known that I, ROBERT F. DEVINE, of Erie, Erie county, Pennsylvania, have invented a new and useful Apparatus for Handling Forgings, 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 sectional plan view of one form of apparatus embodying my invention, the section being taken on the line I—I of Fig. 2; Figs. 2 and 3 are vertical sections taken respectively on the lines II—II and III—III of Fig. 1; Fig. 4 is a sectional plan view of the trolley and smaller turntable, the section being taken on the line IV—IV of Fig. 2; and Fig. 5 is a detail sectional view showing the cylinder and the hub or support therefor; and Fig. 6 is a sectional plan view, showing a modification.

My invention has relation to apparatus for handling forgings during the heating and forging operation, and is designed to provide means of this character by which the piece to be forged can be transferred from the furnace to the forge and properly manipulated under the action of heating, forging or pressing, the apparatus being so arranged as to provide for the full control of the piece under the hammer, press and furnace, and to enable it to be manipulated by the apparatus with substantially the same control as in hand forging.

A further object of the invention is to provide apparatus of this character, which will be capable of handling pieces or forgings of various shapes and sizes.

The nature of my invention will be best understood by reference to the accompanying drawings, in which I have shown 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 the invention as defined in the appended claims.

In these drawings the numeral 2 designates the base of the apparatus, provided with a circular support 3, bolted to the lower part of a circular track 3^a and supporting the upper part 4 of a circular track for a turntable having the wheels which travel between the tracks 3^a and 4; said turntable hav-

ing also a central bearing at 5 upon which it turns.

7 designates suitable bracing for the turntable, and 8 are diametrically extending tracks which form the body of the turntable, the wheels 6 being carried by frame end braces 6^a of tracks 8 and bearings 6^b bolted with I-beam braces 7. These tracks as shown in Figs. 2 and 3, consist of upper and lower pairs of rails between which are mounted the wheels 9 of a carriage or trolley 10, said carriage or trolley being freely movable upon said tracks. This carriage carries a table 11, upon which is mounted a second turntable 12, preferably upon ball bearings 13.

Rising from the table 12 are the four posts or columns 14. 15 are two cross-heads or slides, each mounted to slide vertically on these columns, and which are provided with bearings 16 for the trunnions 17 of a hub or carrier 18 of a work holder or cylinder 19. The cylinder 19 forms the holder for the piece to be forged, and may be of the character described and claimed in my Patent No. 740,100 of September 29, 1903, to which reference may be had for a more complete description thereof, or it may consist of suitable tongs 19^a, such as shown in Fig. 2, and which form the subject matter of my application, Serial No. 467,791, filed December 16, 1908. This cylinder is mounted to slide endwise through the hub or carrier 18, and also to rotate therein, the hub or carrier being provided with one or more sets of anti-friction rollers 20, against which the exterior of the cylinder bears. The cylinder is rotated on these bearings by means of a worm gear wheel 21 driven by an electric motor 22 through the reduction gearing 23.

24 designates springs, which are coiled around the trunnions 17 between the hub or carrier 18 and the cross-heads or slides 15. The bearings 16 are in the form of sleeves, which are extended through the slides 15 and which engage slotted arms or housings 25, to which are attached the ends of chains 26. These chains pass upwardly and over toothed wheels on a transverse shaft 27 journaled at the top of the posts or columns 14, and thence downwardly and around toothed wheels 27^a at the base of the columns, one end of each chain being attached to the arms 25 above the trunnions 17, and the other end of each chain being attached to said arms

below said trunnions. The shaft 27 is arranged to be driven by an electric motor 28 supported on a frame 29 secured to the tops of the posts or columns 14.

30 designates springs sealed in the slots of the arms or housings 25 and which co-operate with the springs 24 before referred to to prevent the thrusts of the forging hammer from being transmitted to the other parts of the apparatus.

The main turntable is revolved through the desired angle by means of the motor 31 having a pinion 32 driven through the intermediate gearing 33 and engaging the teeth of the rack 34 bolted to lower circular track plate 3^a. The carriage or trolley 10 is reciprocated on the tracks 8 by means of a motor 36 mounted thereon, and geared to a winding drum 37 around which is wrapped the ends of oppositely extending cables 38, the other ends of these cables being connected to the truck wheel frames 6^a of the turntable at opposite sides of the machine, as shown in Fig. 1.

The operation will be readily understood.

The main turntable is operated to bring the cylinder 19 into position to receive from the furnace the piece to be forged and to carry it to the forging machine, press or hammer. The motor 36 is then operated to move the carriage or trolley 10 to the desired position on the tracks 8. Smaller angular movements of the piece are effected by turning the smaller turntable 12. The piece is raised and lowered by the operation of the motor 28, and is rotated for rounding up by means of the motor 22. For heavy pieces, the main weight of the piece will preferably be carried by a supporting chain 39 from a suitable overhead crane or other support, as in hand forging, and the motor 28 can then be operated to tilt or tip the piece in a vertical plane. These several movements provide for perfect control of the piece to be forged, which can be of various sizes or shapes, and can, by a proper combination of movements be manipulated by the apparatus with the same freedom as in hand forging.

Instead of mounting the apparatus upon a turntable in the manner described, the carriage or trolley 10 may be mounted upon rails 40 (see Fig. 6), constituting a crane-bridge, and mounted on wheels 41 which travel on tracks 42 at right angles to the rails 40. The apparatus carried by the carriage or trolley 10 is the same as that shown in the other figures. The cables 38 are in this case connected to the truck frames 43 at the ends of the tracks 40. Upper and lower rails 40 are preferably employed between which the wheels 9 of the trolley or carriage travel. The bridge formed by the rails 40 is moved on the tracks 42 by means of a motor 44. The shaft of the motor car-

ries a pinion 45 which meshes with a gear wheel 46 on a shaft 47. On each end of this shaft 47 is a pinion 48 which meshes with a gear wheel 49 attached to the axle of one of the wheels 41. In this construction, the transfer movements are obtained by moving the apparatus longitudinally on the tracks 42, and angular movements by means of the turntable 12.

It will be understood that I do not limit myself to the use of the cylinder 19 as the means for supporting the work, since this may be of any desired character.

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

What I claim is:—

1. In forging apparatus a circularly movable support, a carriage or trolley mounted thereon, a turntable on the carriage or trolley, and a holder for the work mounted on the turntable; substantially as described.

2. In forging apparatus, a circularly movable support, a carriage or trolley mounted thereon, a turntable mounted on the carriage or trolley, a work holder mounted on the turntable, and means for rotating the work holder; substantially as described.

3. In forging apparatus, a movable support, a carriage or trolley mounted thereon, a turntable mounted on the carriage or trolley, a work holder mounted on the turntable, and movable upon a horizontal axis independently of the movement of the table, and means for raising and lowering the work holder; substantially as described.

4. In forging apparatus, a movable support, a carriage or trolley mounted thereon, a turntable mounted on the carriage or trolley, a work holder mounted on the turntable, and movable upon a horizontal axis to different angular positions and means for rotating and also for bodily raising and lowering the work holder; substantially as described.

5. In forging apparatus, the combination with a movable support, a carriage mounted to travel on said support, means for reciprocating the carriage, a turntable mounted on the carriage, and a work holder mounted on the turntable said holder being supported to swing vertically upon a horizontal axis; substantially as described.

6. In forging apparatus, the combination with a movable support, motive means for actuating the support, a carriage or trolley mounted on said support, motive means for actuating the carriage or trolley, a turntable mounted on the carriage or trolley, and a work holder mounted on the turntable said holder being supported to swing vertically upon a horizontal axis, together with motive means for actuating the work holder; substantially as described.

7. In forging apparatus, a movable carriage or trolley, a turntable mounted thereon, posts or columns carried by the turntable, slides mounted on said posts or columns, and a work holder carried by said slides; substantially as described.

8. In forging apparatus, the combination of a carriage or trolley, vertical posts or columns carried thereby, slides arranged to reciprocate on the posts or columns, motive means for raising and lowering the slides, and a work carrier trunnioned in said slides; substantially as described.

9. In forging apparatus, a movable carriage or trolley, a turntable mounted thereon, posts or columns carried by the turntable, slides engaging said posts or columns to reciprocate thereon, a work carrier trunnioned in said slides, and motive means for raising and lowering the slides and also for rotating the work carrier; substantially as described.

10. In forging apparatus, the combination of a carriage or trolley having vertical guides, slides movable vertically on said guides, a hub or carrier trunnioned in said slides, and a work holding cylinder rotatably mounted in said hub or carrier; substantially as described.

11. In forging apparatus, the combination

of a carriage or trolley having vertical guides, slides movable vertically on said guides, a hub or carrier trunnioned in said slides, a work holding cylinder rotatably mounted in said hub or carrier, and motive means for rotating the cylinder; substantially as described.

12. In forging apparatus, the combination of a turntable, vertical guides carried thereby, a work carrier mounted for vertical movement on said guides and also for swinging movement between the guides on a horizontal axis, and a work-holding device mounted in said carrier; substantially as described.

13. In forging apparatus, the combination with a carriage or trolley, of vertical posts or columns carried thereby, slides vertically movable on said posts or columns, a hub or carrier trunnioned in said slides, a work holding cylinder rotatably mounted in the hub or carrier, and spring means for absorbing the shocks imparted to the work holder or carrier; substantially as described.

In testimony whereof, I have hereunto set my hand.

ROBERT F. DEVINE.

Witnesses:

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CHARLES G. BREVILLIER.