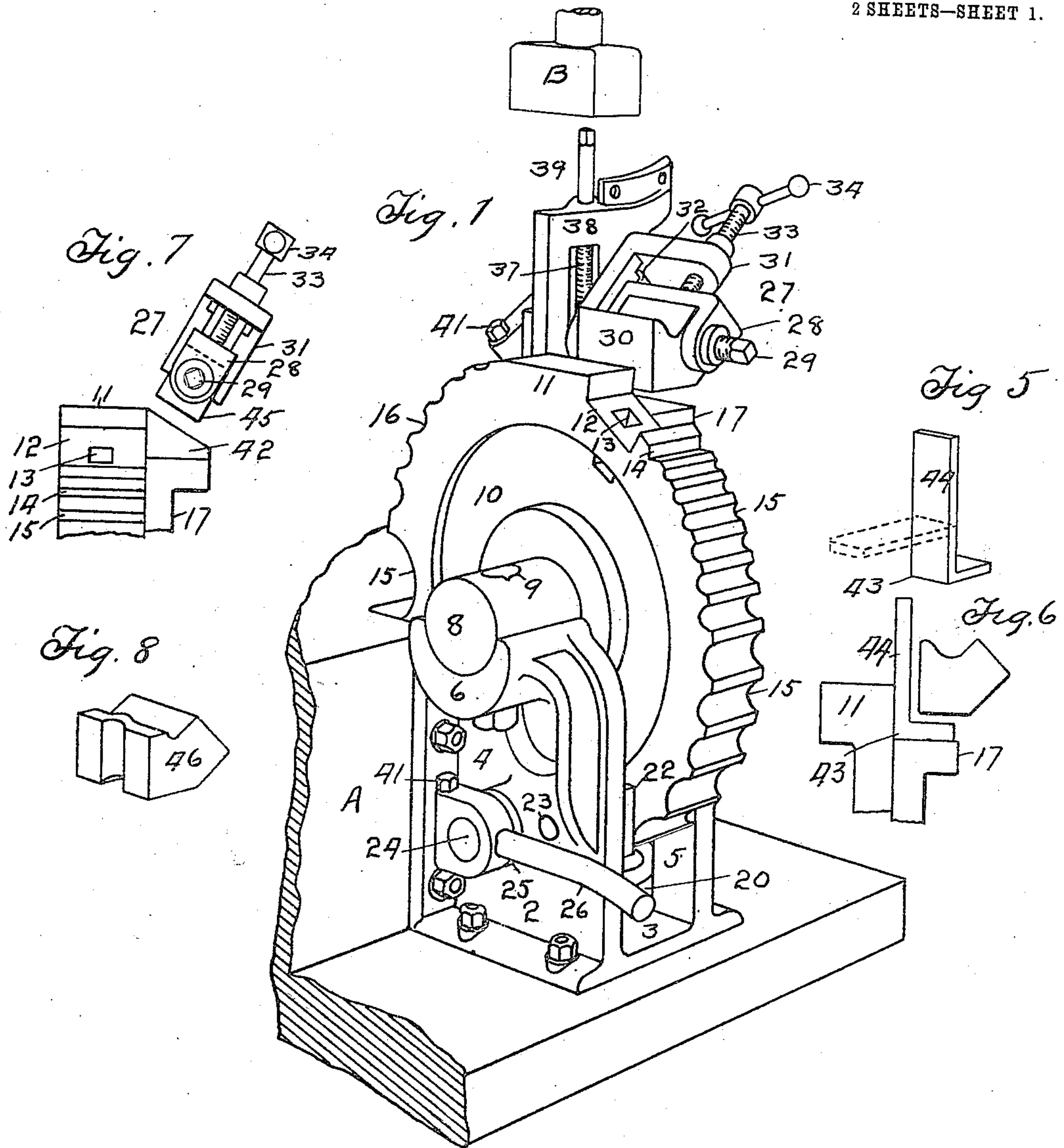


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 2 SHEETS—SHEET 1.



Witnesses

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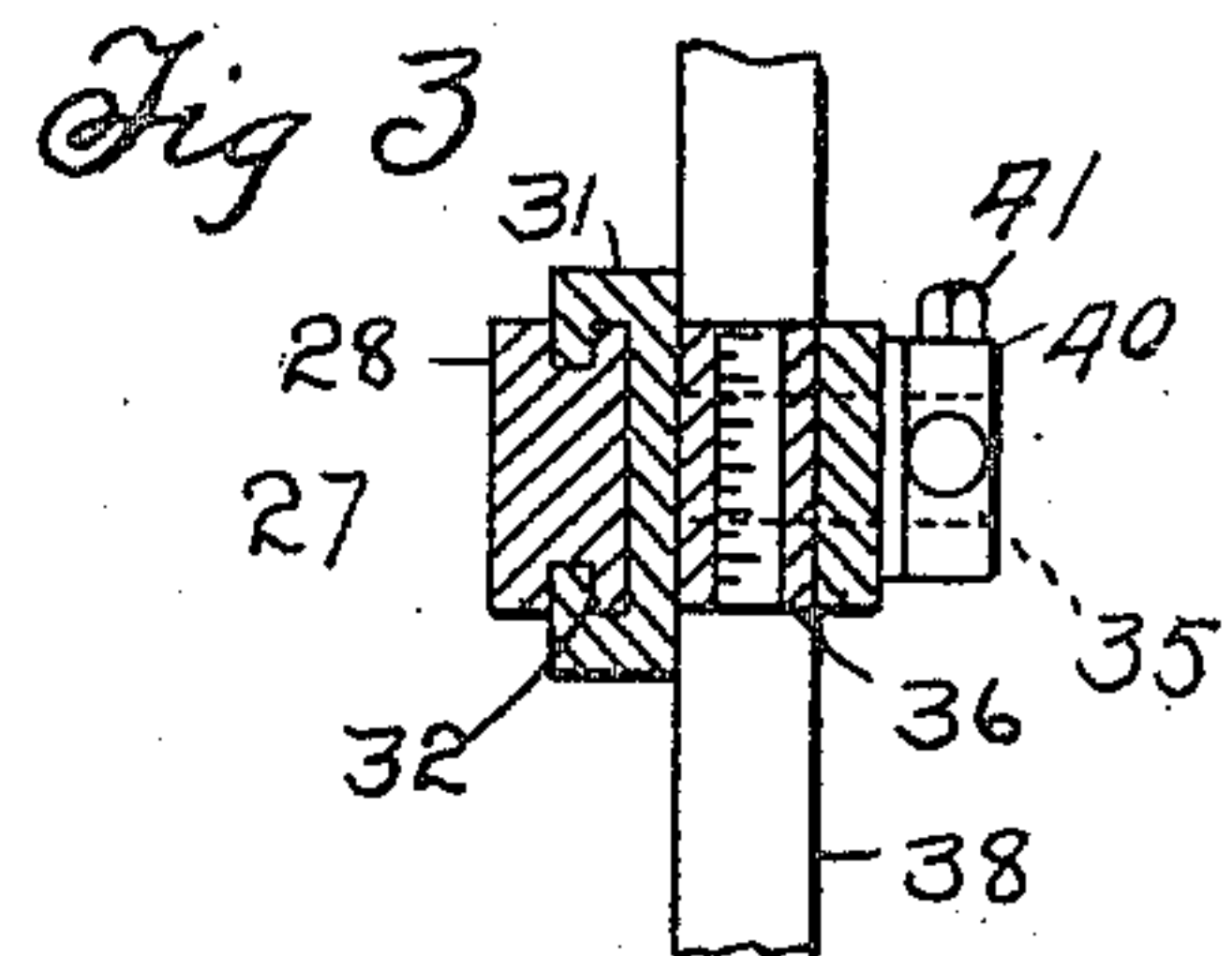
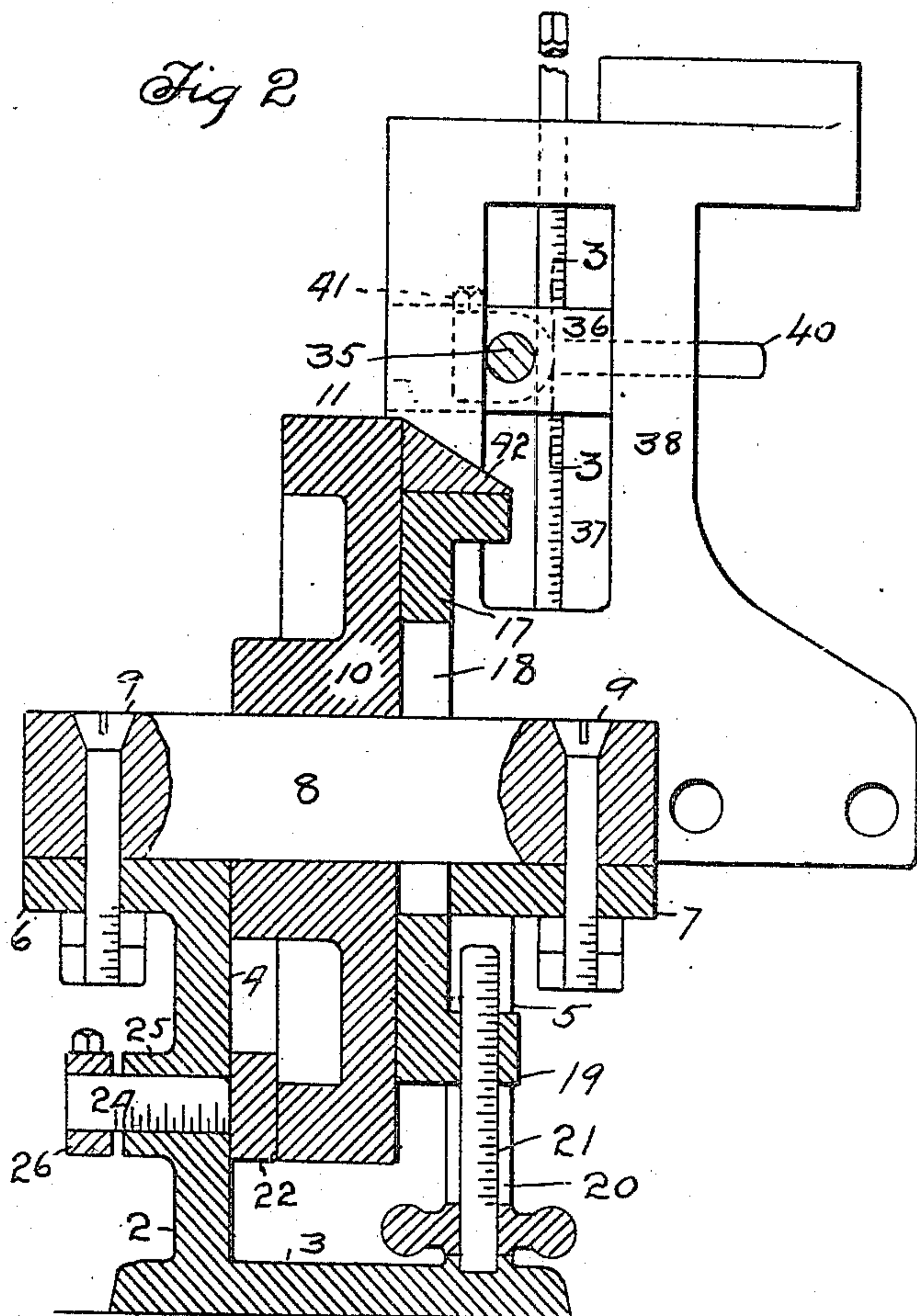
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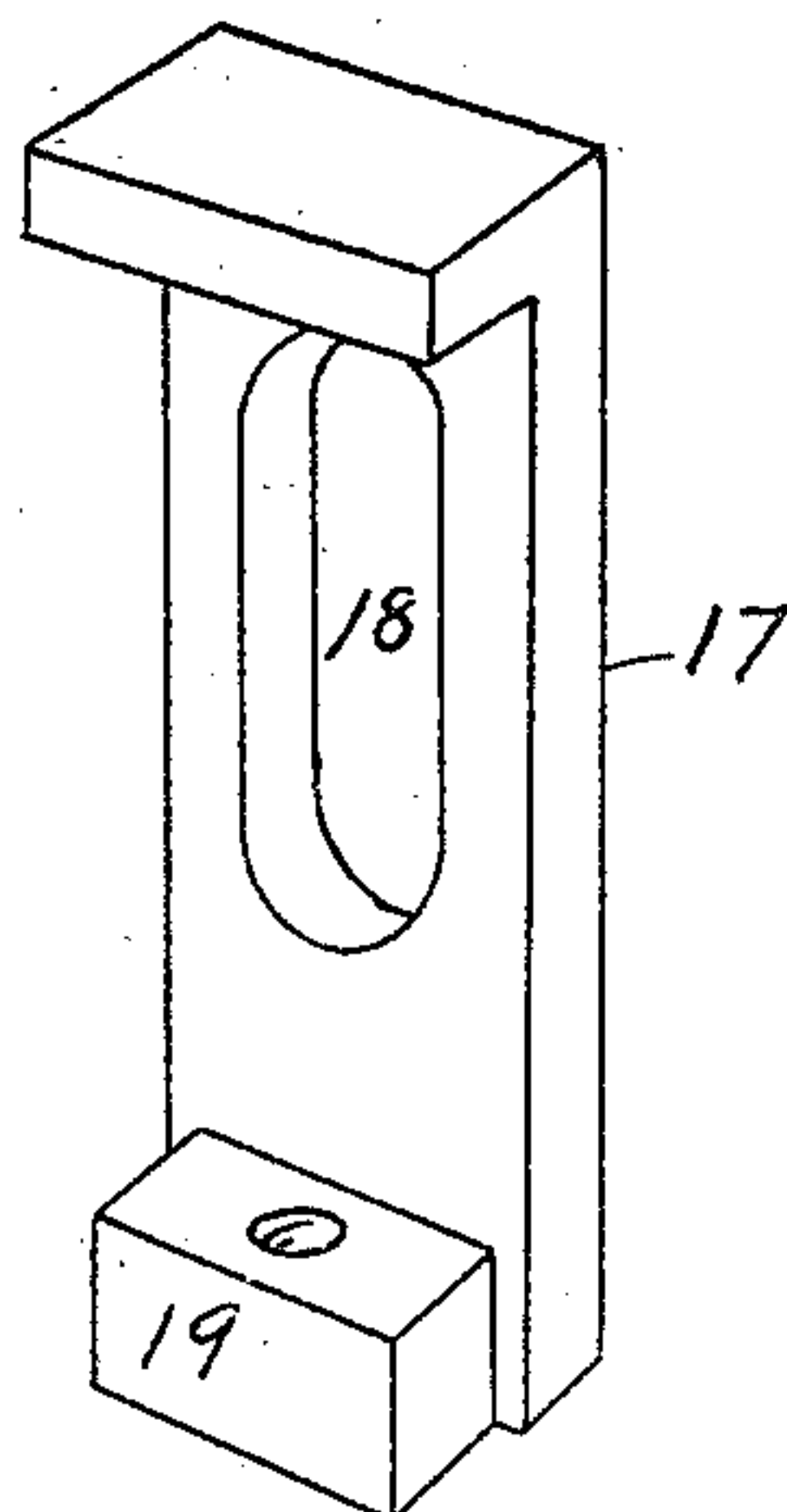
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2 SHEETS—SHEET 2.



*Fig 4*



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# UNITED STATES PATENT OFFICE.

FRED E. SUTHERLAND AND JAMES A. BROWN, OF LOS ANGELES, CALIFORNIA, ASSIGNORS TO THE RADIAL POWER HAMMER COMPANY, OF LOS ANGELES, CALIFORNIA, A CORPORATION OF CALIFORNIA.

## COMBINED VISE AND FORMING APPARATUS.

951,975.

Specification of Letters Patent. Patented Mar. 15, 1910.

Application filed February 15, 1909. Serial No. 478,047.

*To all whom it may concern:*

Be it known that we, FRED E. SUTHERLAND and JAMES A. BROWN, citizens of the United States of America, residing at Los Angeles, county of Los Angeles, State of California, have invented a certain new and useful Combined Vise and Forming Apparatus; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to a vise which is adapted to be combined with forming apparatus.

One object of the invention is, to provide a device which will permit an apparatus of this class to accomplish a large variety of work with a few inexpensive appliances but which is also adapted to make use of those specially formed.

A further object of the invention is to provide a construction which permits the appliances being applied at varying angles to the work.

Another object of the invention is to permit the apparatus being used on different thicknesses of stock without change of adjustment.

Still another object of the invention is to provide a construction which permits of certain parts being simultaneously locked in operative position by manipulation of a single handle.

Other objects and advantages of the invention will be apparent from a consideration of the following description of one form of apparatus in which the invention may be embodied, reference being had to the accompanying drawings, in which—

Figure 1 is a perspective view of the apparatus adapted to be used with a power hammer, parts only of the latter being shown; Fig. 2 is a vertical central section of the apparatus; Fig. 3 is a sectional detail taken on line 3—3 of Fig. 2, the lifting screw being omitted; Fig. 4 is a perspective view of the shelf; Fig. 5 is a perspective view of a bar with an initial bend therein; Fig. 6 is an elevational detail showing the above bar in position in the apparatus; Fig. 7 is a similar view showing the method of making a simple angular bend; and Fig. 8 is a

perspective view of a jaw for off-setting round stock.

The frame 2 of the apparatus is attached to the frame A of a power-hammer of any suitable or approved construction, the head B whereof is shown in raised position (Fig. 1). Frame 2 comprises the base plate 3 and the standards 4 and 5. The upper part of standards 4 and 5 carry brackets 6 and 7, in the concave upper surfaces of which rests shaft 8 secured to the brackets by bolts 9. Upon shaft 8 is rotatively mounted a work support 10, which has around its periphery a variety of swages. The swage marked 11 comprises a surface in a plane perpendicular to the radius of the work support. That portion of work support 10 marked 12 comprises a similarly disposed surface sunk below the periphery and having therein an opening 13 into which the shank of a detached swage may be inserted. Swage marked 14 comprises a V-shaped groove, those marked 15 are semi-cylindrical grooves, while those marked 16 are substantially semi-conoidal grooves. At the rear of work support 10 (Figs. 2 and 3) is disposed a shelf 17 having an opening 18 therein through which shaft 8 passes. A cross-head 19 is disposed in a central slot 20 in standard 5 and has threaded therein screw 21 by which it may be raised or lowered, the end of said screw resting on the bottom portion 3 of frame 2.

Work support 10 may be clamped to prevent rotation, and shelf 17 may be locked in position by the following described mechanism: A plate 22 is held between the lower part of work support 10 and standard 4 by means of dowels 23 secured in said plate and passing freely through holes in the standard. A screw 24 threaded in hub 25 on standard 4 bears against plate 22 and is adapted to be operated by means of handle 26. By this construction member 10 and shelf 17 are simultaneously clamped between plate 22 and standard 5.

Referring again to Fig. 1, the jaw-holder 27 is arranged and adapted to permit operating on material being worked, by the co-action of a jaw in the holder with the shelf 17 and work support 10, and consists of a bracket 28 wherein by means of clamping screw 29, any one of a variety of jaws, such as 30, may be held. Bracket 28 is held in



frame 31 in T-slot 32 (Fig. 3), and may be moved along said slot by means of screw 33 operated by handle 34. Frame 31 has threaded into it a bolt 35 (Fig. 2) passing through cross-head 36, which latter slides vertically in slot 37 of frame 38 bolted to frame A. Crosshead 36 and consequently jaw holder 27 are raised or lowered by means of screw 39 threaded in crosshead 36 and journaled in frame 38. To the head of bolt 35 is attached a handle 40. Handles 26 and 40 are clamped upon screw 24 and bolt 35 respectively by means of bolts 41. In order that the handles may be in convenient operating position, the bolts 41 passing through the split end of each handle can be loosened to permit turning of the handle on the screw or bolt, after which tightening of the bolts clamps each handle in position.

Any one of a variety of differing blocks may be used upon the top of shelf 17 to permit the making of bends of the desired character. In Fig. 2 is shown a block 42 adapted for making a bend of 30 degrees.

The operation of the apparatus is substantially as follows: For making an offset, the apparatus is set up as shown in Fig. 1. An initial bend 43 in the bar 44, as shown in Fig. 5, having previously been made by any preferred means, the bar is placed in position on shelf 17, as indicated in Fig. 6. Jaw 30 is then moved downwardly and forwardly upon the bar 44, by means of screw 33 operated by handle 34, clamping the bar upon shelf 17 and against work support 10. From the angle given to jaw 30 and the direction of movement thereof any thickness of stock is held without need of adjustment for any given amount of offset. The free end of the bar is pulled forward over swage 11 and the angle of the second bend made, as indicated in dotted lines (Fig. 5), by bringing the head B of the hammer down upon the bar, or by using a flatter under the hammer. The length of the offset is determined by the height of shelf 17. In making a simple bend, block 42, or one having the angle desired, is placed upon shelf 17 and a plain jaw 45, as shown in Fig. 7, clamped in bracket 28. The bar having been placed in position, jaw 45 is brought down upon it and the bend made over swage 11, as has been previously described. To bend round stock, handle 26 is operated to release work support 10 and shelf 17, and the right-sized one of the grooves 15 is brought into position at the upper part of the work support. A block such as 42, having the proper angle, is placed upon shelf 17, and a jaw having a groove corresponding to the diameter of the stock is inserted in bracket 28 to have the groove parallel to the surface of block 42. Shelf 17 and frame 31 are then adjusted to the proper height and handles 26 and 40 operated to clamp the parts in

position. A swage is then used over work support 10 by which the stock may be driven into groove 15. In making short bends in rectangular or round stock, block 42 is not used, and jaw-holder 27 may be adjusted horizontally. For offsetting round stock, a jaw 46 of a shape similar to that shown in Fig. 8 may be used. Groove 14 is used for bending square stock in the plane of one of its diagonals. For work that cannot be accommodated in any of the swages mentioned, a special swage may be inserted in opening 13 and used in the manner previously set forth.

From the foregoing it will be seen that the rear face of work support 10, the shelf 17 and jaw-holder 27, taken together, constitute a vise wherein work may be held to be accurately formed or bent as desired.

While one form of apparatus in which the invention may be embodied has been illustrated and described, it is obvious that various modifications and changes may be made. For instance, a stationary work support may be employed in place of the rotary support shown. The right is reserved to all changes and modifications which do not depart from the spirit and scope of the invention.

We claim:

1. The combination with a work support, of a pivotally mounted jaw holder constructed and arranged to coact with said support to hold work thereon, means for adjusting said jaw holder, and means to lock said jaw holder in position.

2. The combination with a work support having around its periphery a variety of swages, of means comprising a pivotally mounted jaw holder constructed and arranged to coact with said support to hold work thereon, and means for adjusting said jaw holder.

3. The combination with a work support, of a shelf associated therewith, said shelf and work support movable relatively to each other, an adjustably mounted jaw holder, and a jaw in said holder adapted to coact with said support and shelf in operating on stock being worked.

4. In a forging vise, in combination, a work support, a movable shelf adjacent thereto, and a holder adapted to hold any one of a variety of jaws and to bring said jaw into operative relation to said support and shelf to hold stock being operated upon.

5. In a forging vise, in combination, a work support, a shelf arranged contiguous thereto, means to raise and lower said shelf, and a jaw-holder adapted to hold any one of a variety of jaws in operative relation with said support and shelf.

6. In a forging vise, in combination, a work support, a movably mounted shelf contiguous thereto, and a pivotally mounted jaw-holder associated therewith.



7. In a forging vise, in combination, a work support, a movably mounted shelf contiguous thereto, a pivotally mounted jaw-holder, and means whereby a jaw held thereby may be brought into operative relation with said shelf.

8. In a vise combined with forming apparatus, a rotary work support having around its periphery a variety of swages, a shelf associated therewith, a holder adapted to hold a jaw in operative relation with said support and shelf in operating on material being worked, and a clamp that simultaneously locks said shelf and support.

9. In a vise combined with forming apparatus, a work support, a shelf associated therewith, a jaw holder coacting with said support and shelf in operating on material being worked, raising means for said shelf, and a clamp that simultaneously locks said support and shelf in position.

10. In a vise combined with forming apparatus, a work support, a shelf adjustably mounted adjacent thereto, a jaw-holder operatively associated therewith, and raising means for said shelf and for said jaw-holder.

11. In a vise combined with forming apparatus, a rotary work support having around its periphery a variety of swages, a shelf associated therewith, a holder adapted to hold a jaw in operative relation with said support and shelf, a clamp that simultaneously locks said shelf and support, and means to clamp said jaw-holder in position.

12. In a forging vise combined with forming apparatus, a work support, a shelf associated therewith and adjustable thereto, a jaw-holder comprising a frame pivotally mounted adjacent to said shelf, a bracket sliding in said frame, a screw passing through said frame and contacting with said bracket, and means to hold a jaw in said bracket.

13. A jaw-holder comprising a pivotally mounted frame, a bracket sliding in said frame, a screw adapted to move said bracket, means to hold a jaw in said bracket, and means to clamp said frame in position.

14. The combination with a work support, of a shelf associated therewith, said shelf and work support movable relatively to each other, an adjustably mounted jaw holder adjacent to said shelf and work support, said jaw holder comprising a frame, a bracket sliding in said frame, means to hold a jaw in said bracket, and means to adjust said bracket in said frame.

In testimony whereof, we have signed our names to this specification in the presence of two subscribing witnesses at Los Angeles, county of Los Angeles, State of California, this 29th day of January, A. D. 1909.

FRED E. SUTHERLAND.  
JAMES A. BROWN.

Witnesses:

ELIZABETH KENDRICK,  
FRED W. MORRISON.