(No Model.) 3 Sheets—Sheet 1.

T. & J. COULTER.

MACHINE FOR TAPERING AND SHAPING METAL BARS.

No. 493,982. Patented Mar. 21, 1893.

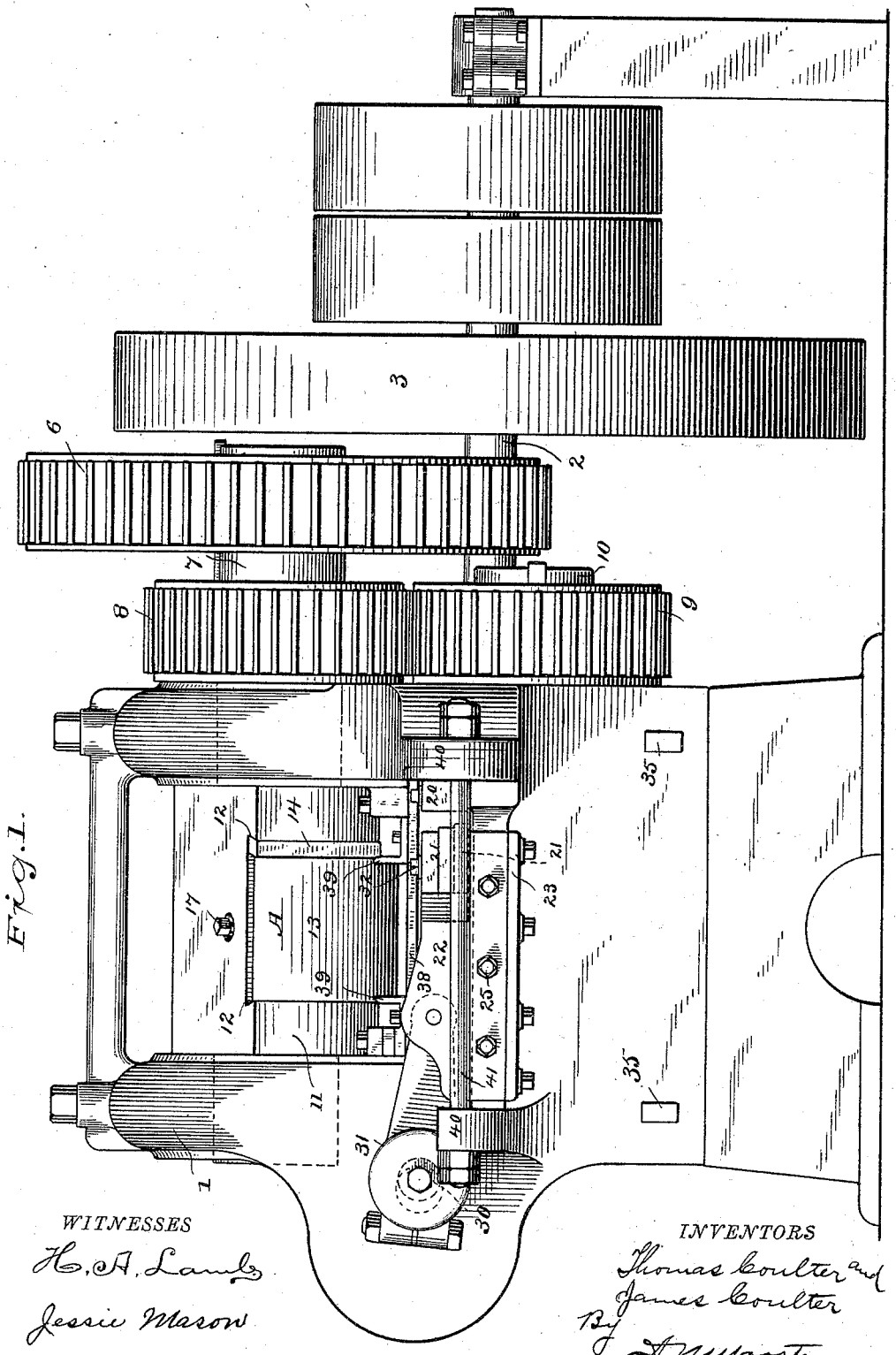

Fig. 1.

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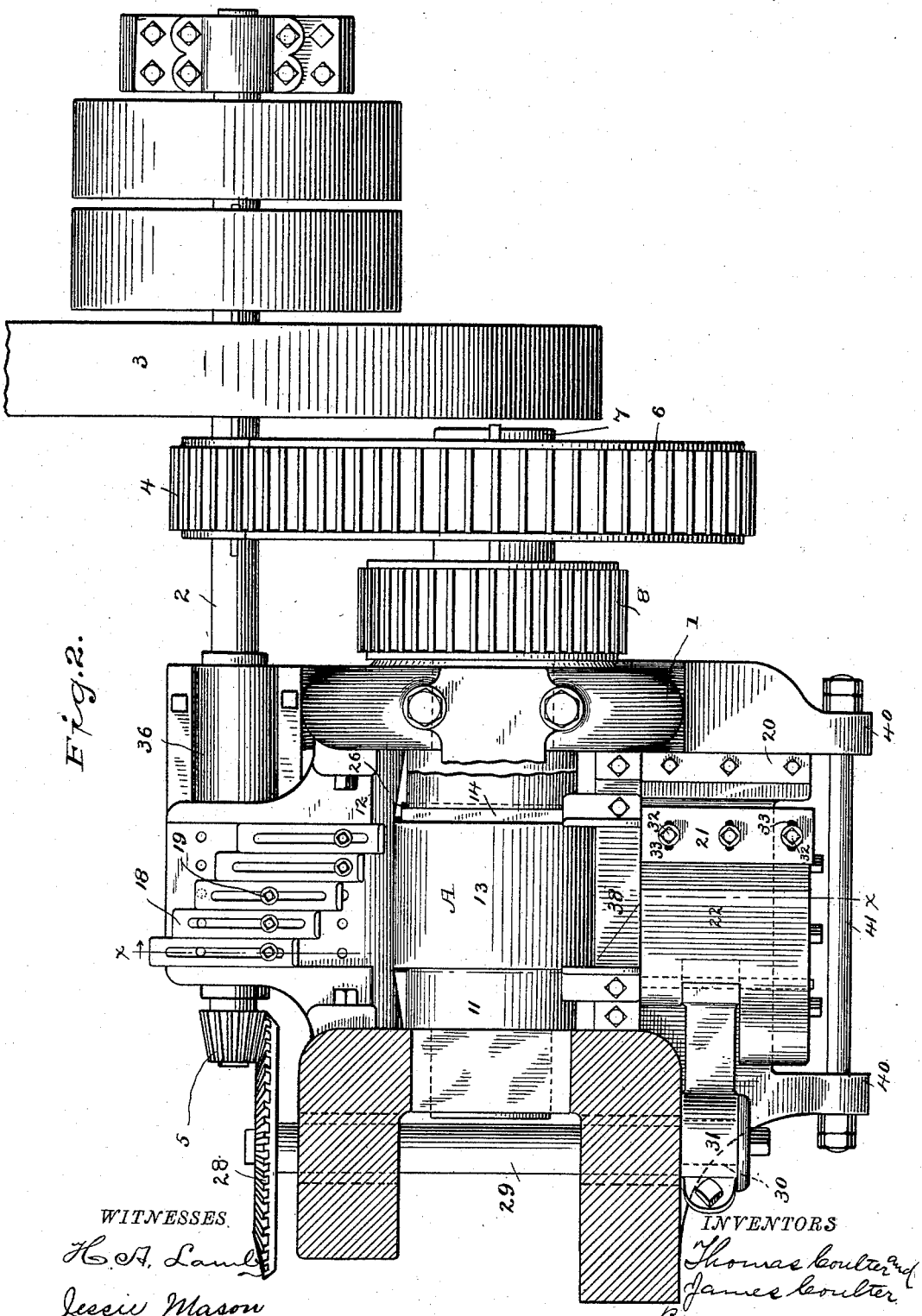

Fig. 2.

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Fig. 4.

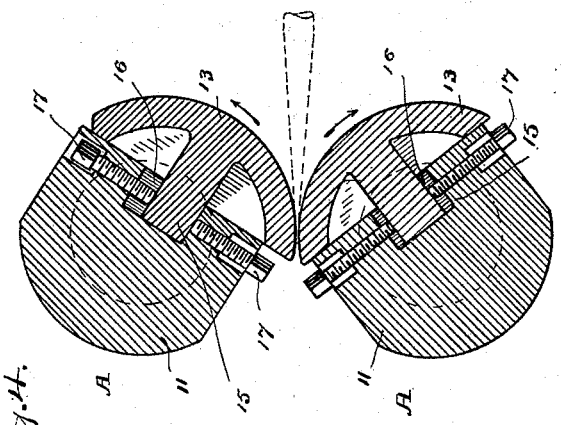


Fig. 5.

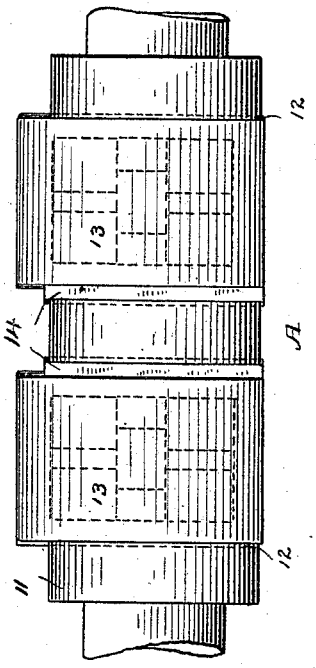
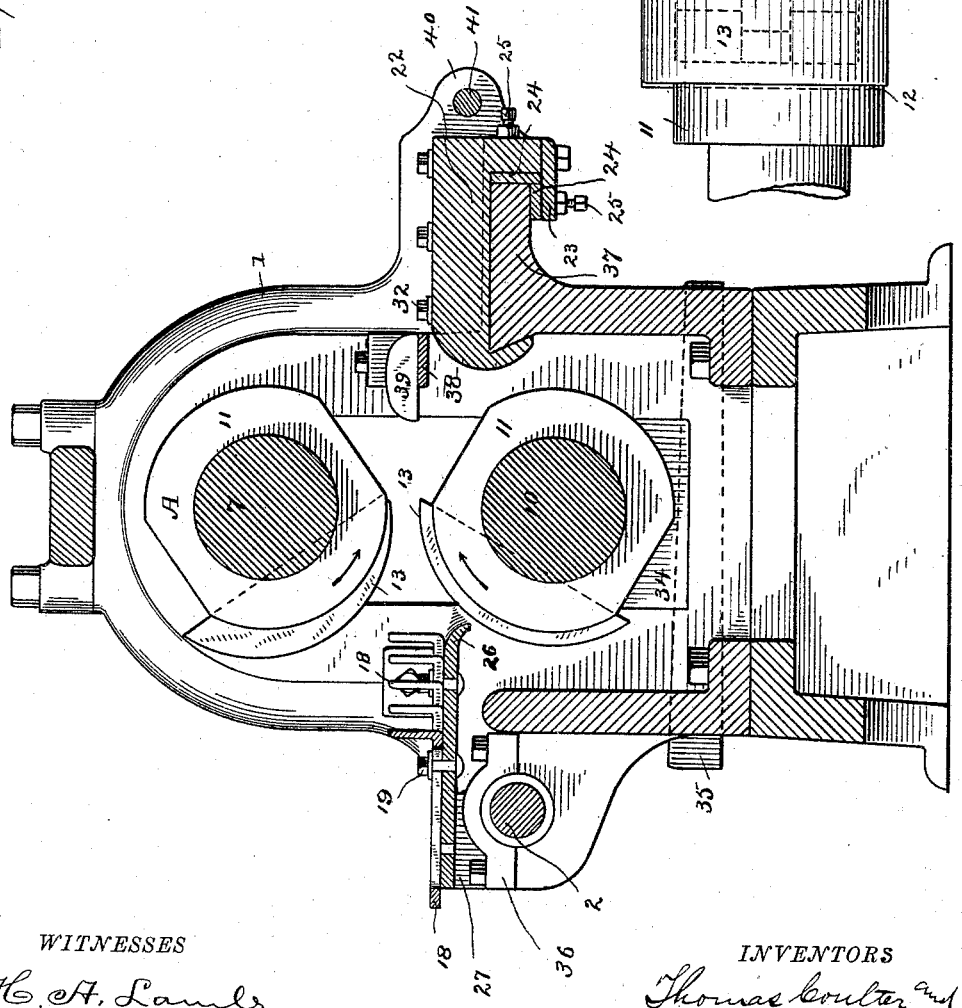


Fig. 3.



WITNESSES

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UNITED STATES PATENT OFFICE.

THOMAS COULTER AND JAMES COULTER, OF BRIDGEPORT, CONNECTICUT.

MACHINE FOR TAPERING AND SHAPING METAL BARS.

SPECIFICATION forming part of Letters Patent No. 493,982, dated March 21, 1893.

Application filed August 29, 1892. Serial No. 444,485. (No model.)

To all whom it may concern:

Be it known that we, THOMAS COULTER and JAMES COULTER, citizens of the United States, residing at Bridgeport, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Machines for Tapering and Shaping Metal Bars; 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.

Our invention has for its object to produce a simple, strong and easily adjusted machine for tapering and shaping all kinds of metal bars, and especially adapted for tapering and shaping round bars, our novel machine being capable of producing any required taper in the relatively horizontal plane and of squeezing the bar sidewise so as to impart any required taper to the sides in the relatively vertical plane.

Heretofore so far as we are aware the tapering of the ends of round bars, as for example bars for making spiral car springs, has been performed by hammering which is a slow and expensive operation. Our novel machine enables us to perform this operation quickly and evenly, all the ends being tapered exactly alike.

With these ends in view we have devised the simple and novel machine which we will now describe referring by numbers and letters to the accompanying drawings forming part of this specification in which:

Figure 1 is a front elevation of the machine complete, Fig. 2 a plan view, Fig. 3 a section on the line *x x* in Fig. 2, Fig. 4 a cross section of the tapering rolls, and Fig. 5 is a detail view of a double roll which may be used if preferred in the smaller sized machines.

1 denotes the framework of the machine which may be of any ordinary or preferred construction, and 2 the driving shaft having fast and loose belt pulleys, a fly wheel 3, a pinion 4 and a bevel pinion 5. Pinion 4 meshes with a gear wheel 6 on the upper roll shaft 7, said shaft having also a gear wheel 8 which engages a similar gear wheel 9 on the lower roll shaft 10.

The tapering rolls as a whole are denoted by A. These rolls consist of enlargements 11 formed upon the shafts and preferably made flat on opposite sides as shown in Fig. 3. One of the round sides on each roll down into the shaft itself is entirely removed, leaving under-cut ways denoted by 12 at the sides of the cut away portions. These cut away portions receive roll dies 13 the sides of which incline outwardly and lie parallel to the under cut grooves. The roll dies are simply dropped into place in the cut away portions and are locked there by keys 14 which are forced in between the ends of the roll dies and the ways. These roll dies are made adjustable in order to produce any required taper upon a bar of metal. In order to accomplish this result we provide each roll die with a stud 15 which engages a socket 16 in the body of the roll. The roll dies are adjusted to give the necessary amount of eccentricity to the roll to produce any required taper by means of screws 17 which enter the flat sides of the roll from opposite directions and the ends of which bear against stud 15 as clearly shown in Fig. 4.

Just back of the tapering rolls are a number of adjustable stops 18, five being shown in the drawings, and being quite sufficient under ordinary circumstances. These stops are provided with longitudinal slots through them and are secured to a guard plate 26 by means of screws 19 passing through the slots and engaging holes in the plate. The guard plate rests upon a projection or block 27 cast upon the box 36 for the driving shaft.

38 denotes a cross bar in front of the tapering rolls upon which the bar to be tapered rests as it is passed between the rolls, and 39 denotes side guards secured to the cross bar which retain the bar that is being rolled against lateral displacement.

In use the bar of metal to be tapered is passed in between the rolls, just before the roll dies come into operative position and pressed forward until it comes in contact with one of the stops. Commencing at the right it will be noticed that each stop is set farther back than the preceding one so as to increase the length of the taper, the principle of operation being the same whether the bar is passed between the rolls two, three or more

times. Guard plate 26 is downwardly curved and acts to turn the end of the bar upward against one of the stops should said end drop down for any reason. After being passed between the rolls each time, the bar is squeezed sidewise and shaped by means of a fixed die 20 and one of a series of dies 21 carried by a slide 22 which moves upon a plate 37 forming part of the frame of the machine as clearly shown in Fig. 3, the slide being held in place by an under plate 23 bolted thereto, and lost motion being taken up by gibs 24 which are engaged by screws 25.

40 denotes heavy eyes which extend outward from the framework of the machine and 41 a cross rod between said eyes by which this portion of the machine is braced and strengthened. The bevel pinion 5 at the opposite end of the driving shaft from the belt pulleys engages a bevel gear 28 on a transverse shaft 29. This shaft is provided with an eccentric 30, see dotted lines Fig. 2 which is engaged by an eccentric strap 31, the opposite end of which is pivoted to the slide. Dies 21 are adjustably secured to the slide by means of screws 32 which pass through slots 33 in the dies and engage the slide. This enables us to reduce the bars sidewise as much or as little as may be required. The squeezing dies shown in the drawings are so shaped as to leave the bar straight sided. Should an inward or outward taper be required the dies shown in the drawings would be removed and tapering dies substituted in lieu thereof. In practice dies 21 are placed one above the other in the form of steps, the width of said dies varying so as to enable us to produce any required width or taper.

34 denotes the bearings of the lower roll shaft which are made adjustable by means of wedges 35 adapted to be driven in under said bearings to raise them as may be required.

In the smaller sized machines the roll shafts may each be provided with two roll dies instead of one, as indicated in Fig. 5, so that two operators may use the machine at the same time.

Having thus described our invention, we claim—

1. The combination with the roll shafts, each being provided with an adjustable roll die, of a series of adjustable stops back of the roll dies and a curved guard plate acting to throw the end of a bar of metal against one of the stops should the bar become depressed.

2. The combination with the driving shaft, the roll shafts, transverse shaft 29 having an eccentric, and suitable connections between said shaft and the driving shaft, of tapering rolls upon the roll shafts, fixed die 20, a slide 22 carrying adjustable dies 21 and a strap pivoted to the slide and engaging the eccentric.

3. The combination with the roll shafts and adjustable roll dies carried thereby for tapering a bar in the relatively horizontal plane, of die 20 and a series of adjustable squeezing dies 21 carried by a reciprocating slide whereby the bars are shaped in the relatively vertical plane.

4. The combination with the roll shafts and adjustable roll dies carried thereby, die 20 and dies 21 carried by a reciprocating slide, of cross bar 38 and side guides 39.

5. The combination with the roll shafts and adjustable roll dies carried thereby, die 20 and dies 21 carried by a reciprocating slide, of guard plate 26 carried by a block 27, and adjustable stops 18 carried by the guard plate.

6. The combination with shaft 2, shaft 29, pinion 4, bevel pinion 5, gear wheels 6, 8 and 9 and bevel gear 28, of the roll shafts and roll dies, die 20, reciprocating slide 22 carrying dies 21, an eccentric on shaft 29, and strap 31 connecting said eccentric with the slide.

7. The combination with the roll shafts and roll dies, of die 20, slide 22, adjustable dies 21 placed above each other on said slide in the form of steps, and suitable means for reciprocating the slide.

In testimony whereof we affix our signatures in presence of two witnesses.

THOMAS COULTER.
JAMES COULTER.

Witnesses:
E. C. SPARGO,
C. H. HUNTOON, Jr.