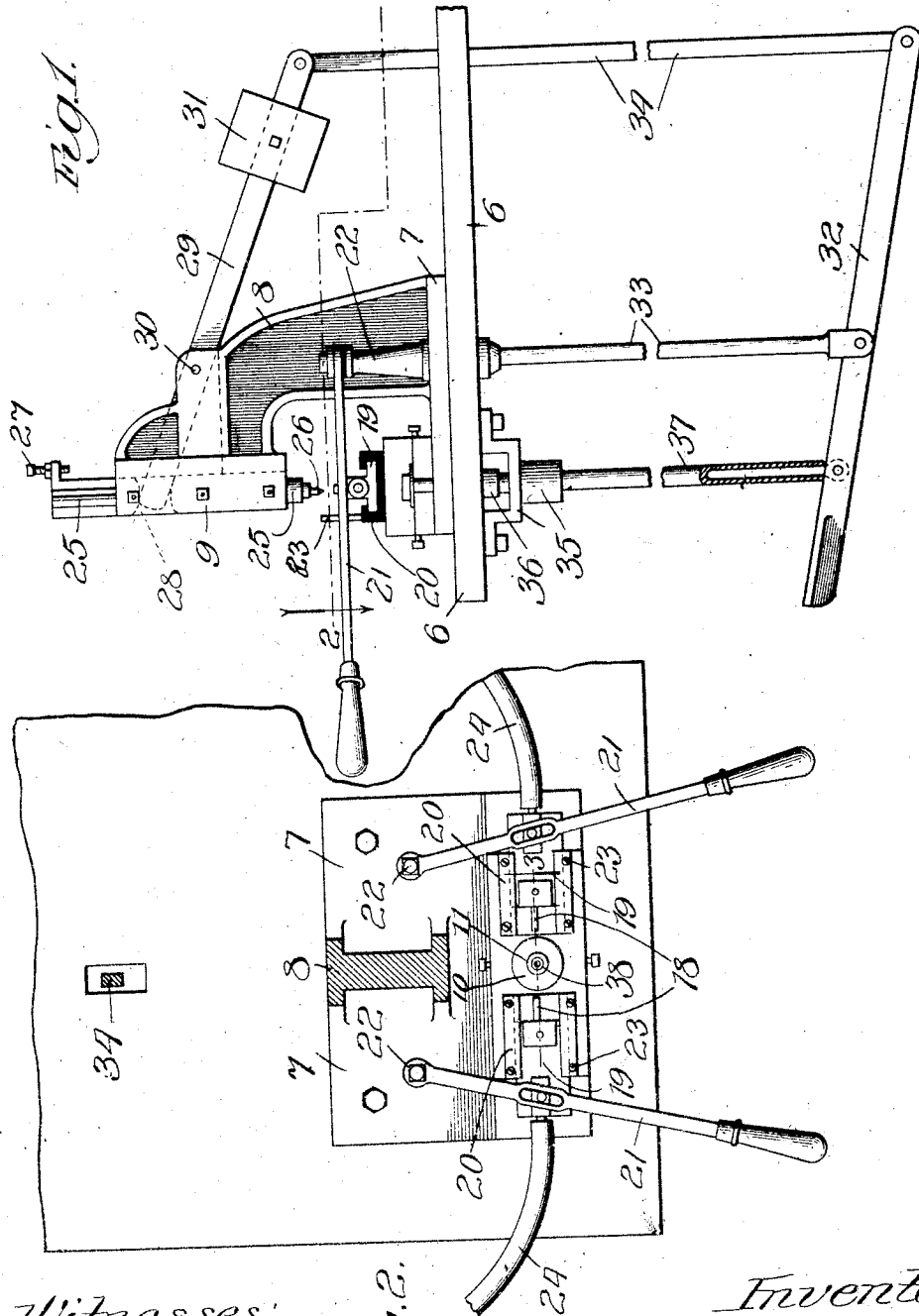


Patented Feb. 21, 1911.

2 SHEETS-SHEET 1.

984,851.



Witnesses:
G. E. Byford,
J. F. Chase.

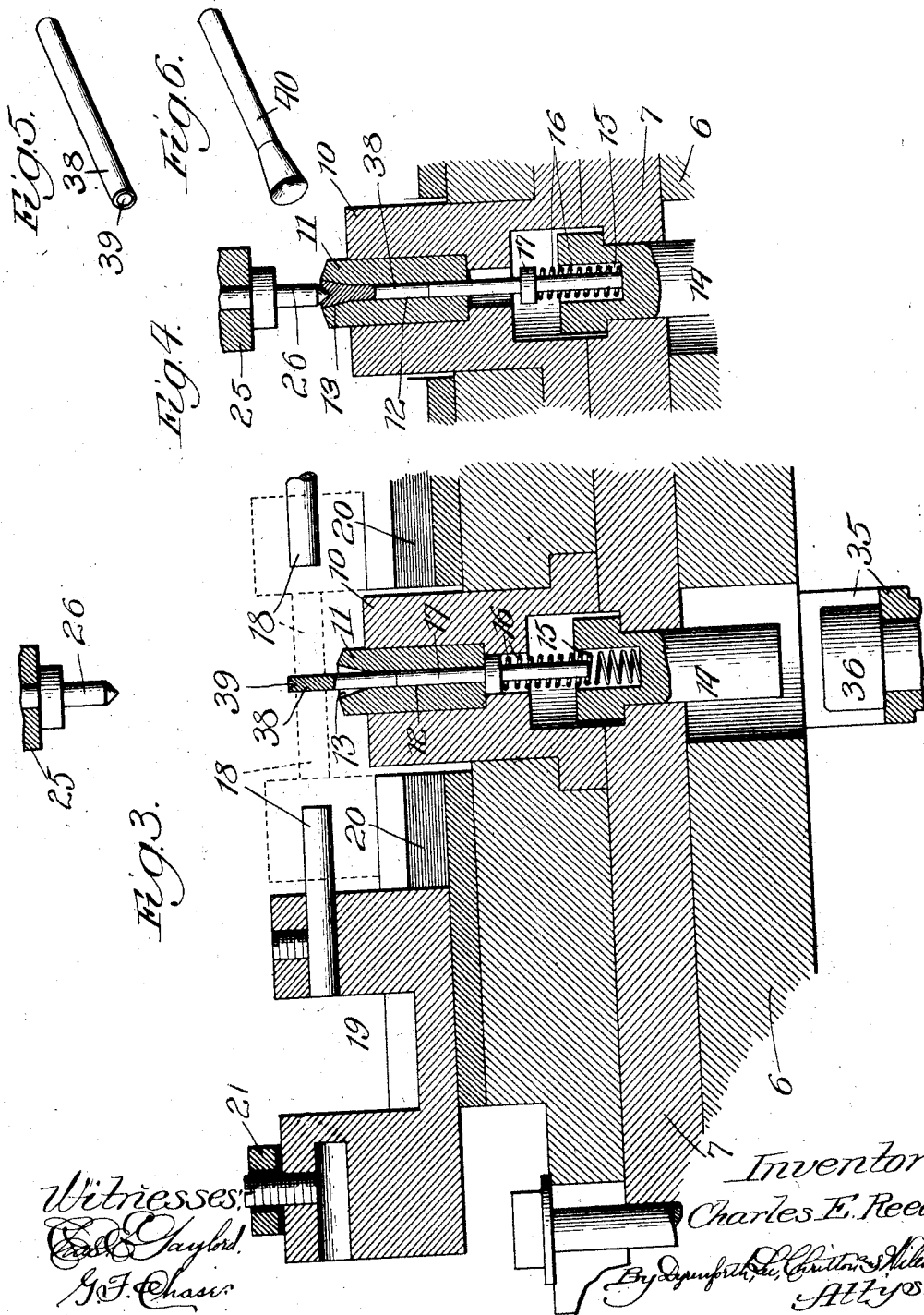
Fig. 2.

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FORGING MACHINE.
APPLICATION FILED SEPT. 24, 1910.

Patented Feb. 21, 1911
2 SHEETS—SHEET 2.

984,851.



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UNITED STATES PATENT OFFICE.

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FORGING-MACHINE.

984,851.

Specification of Letters Patent. Patented Feb. 21, 1911.

Application filed September 24, 1910: Serial No. 582,543.

To all whom it may concern:

Be it known that I, CHARLES E. REED, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Forging-Machines, of which the following is a specification.

My object is to provide a machine of simple and improved construction for use in forging small metal articles, and more especially for use in forging and tempering the cutting-end portions of punches employed in pattern tracing and cutting machines of the general type shown and described in reissue Letters Patent No. 11,569, granted to me September 29th, 1896.

In the accompanying drawings—Figure 1, is a partly broken side elevation of my improved machine; Fig. 2, a broken plan section taken on line 2 in Fig. 1; Fig. 3, a broken and enlarged section taken on line 3 in Fig. 2, and showing an unfinished punch in position, in the machine, to be operated upon; Fig. 4, a view of parts illustrated in Fig. 3, showing the relative positions they occupy upon the completion of an operation; Fig. 5, a perspective view of a punch blank; and Fig. 6, a similar view of a punch formed from the blank and tempered in the machine.

It may be stated that the punch blanks shown in Fig. 5 are, in practice, about seven-eighths of an inch in length and one-eighth of an inch in diameter, with a small socket in one end.

The present machine is employed to soften and expand into frusto-conical form the socketed end of the blank illustrated in Fig. 6, and then temper said end.

The machine is secured upon a table or bench 6, and has a frame consisting of a base 7, neck 8, and head 9. Extending through the base 7, is an opening forming a seat for a metal socket-piece 10, which holds the metal die-block 11. This die-block has an opening 12 through it, the upper end of which is expanded, as indicated at 13. Extending through the bench or platform 6 is a headed plunger 14, having a socket 15 in its upper end. The socket 15 forms a seat for a spring 16 supporting a headed pin 17, which is forced normally by the spring up against the lower end of the die-block 11. Two electrodes 18 are secured to sliding blocks 19 confined in guides 20, of insulating

material or insulated from the frame. The sliding blocks are free to be advanced toward each other by means of operating handles or levers 21 fulcrumed on the base at the points 22, and suitably insulated from the blocks, the frame and from each other. On the guides 20, in the positions shown, are stop pins 23, which limit the movement of the handles 21 toward each other. Extending to the electrodes are flexible insulated wires 24 leading from a suitable electric current supply, preferably an alternating current of low pressure and high current flow. Sliding in the head 9 is a vertical plunger 25 adapted to hold a pointed shaping or expanding die 26. The distance of downward movement of the plunger 25 may be regulated by an adjusting screw 27, which strikes the top of the head 9. Extending through the plunger is an opening 28, into which projects the end of the short arm of a lever 29 fulcrumed at 30. On the long arm of the lever 29 is an adjustable weight 31. 32 is a treadle fulcrumed between its ends upon a hanger 33. The rear end of the treadle is connected with the long arm of the lever 29 by means of a link 34. Fastened against the under side of the platform 6 is a bracket 35 forming a guide for a plunger 36 upon the upper end of a rod 37. The rod 37 is connected at its lower end with the treadle 32.

In operation, a blank 38 is placed in the receiver or die-block 11, as shown in Fig. 3, to rest upon the upper end of the plunger pin 17. This positions the upper end portion of the blank intermediate the electrodes 18. The operator then moves the handles 21 toward each other to the stops 23, causing the electrodes to be moved against opposite sides of the blank, closing the circuit and quickly generating heat, due to contact resistance, sufficient to raise the end portion of the blank to the desired temperature. Thereupon the handles are swung away from each other and the operator bears downward upon the treadle 32. The swinging of the treadle causes the plunger 25 to be lowered and the expanding die 26 to enter the top socket 39 in the blank 38 and press the blank and pin 17 down against the resistance of the spring 16 until the pin strikes the base of the socket 15. Further pressure exerted upon the treadle causes the expanding die 26 to expand the end portion of the punch into the flaring socket 13, as indicated in Fig. 4, thus

producing the completed punch 40 illustrated in Fig. 6. The heat of the upper end of the punch is quickly absorbed by the metal of the die-block 11, thus suitably tempering the end portion of the punch. When the treadle is released by the operator it is returned to initial position by the weight 31, causing the plunger 25 to be raised and the plunger head 36 to press upwardly against the pin 17 to raise the latter to normal position, and at the same time discharge the finished punch. It will be noted that after the socketed end-portion of the blank has been heated and softened by the electrodes and the latter are withdrawn, downward pressure upon the treadle causes the die 26 to press the blank downward and expand its upper end portion quickly against the flaring wall portion 13 of the die-block opening 12, before any material cooling and hardening of the said end-portion of the blank takes place. When, however, the blank is expanded against the wall 13, the latter absorbs heat from the blank with sufficient rapidity to effect the desired tempering of the flared cutting end of the punch. As the machine is operated, in practice, the die-block and surrounding metal parts effect the proper heat-absorption and tempering of the punches without themselves becoming heated sufficiently to require a water-jacket or other artificial cooling means.

What I claim as new and desire to secure by Letters Patent, is:

35 1. In a forging-machine, a pair of relatively movable electrodes, means for moving the electrodes toward and away from each

other, a die-block having an opening to receive and position a blank between the electrodes, a movable die cooperating with said die-block to shape the blank, and a blank expelling plunger in the die-block. 40

2. In a forging-machine, a pair of relatively movable electrodes, means for moving the electrodes toward and away from each other, a die-block having an expanded opening to receive and position a blank between the electrodes, a movable blank-expanding die cooperating with said die-block, and a blank-expelling plunger in the die-block. 45 50

3. In a forging-machine, a pair of electrodes, manually operated handles connected with the electrodes for moving them toward and away from each other, a die-block having an expanded opening to receive and position a blank between the electrodes, a blank-expanding die cooperating with said die-block, and a treadle operatively connected with said blank-expanding die to reciprocate the same. 55 60

4. In an electric tempering and shaping machine, a pair of relatively movable electrodes, means for moving the electrodes toward and away from each other, a die-block having an expanded opening to receive and position a blank between the electrodes, a movable blank expander cooperating with said die-block, and a blank expelling plunger in the die-block. 65

CHARLES E. REED.

In presence of—

R. A. RAYMOND,
R. A. SCHAEFER.