

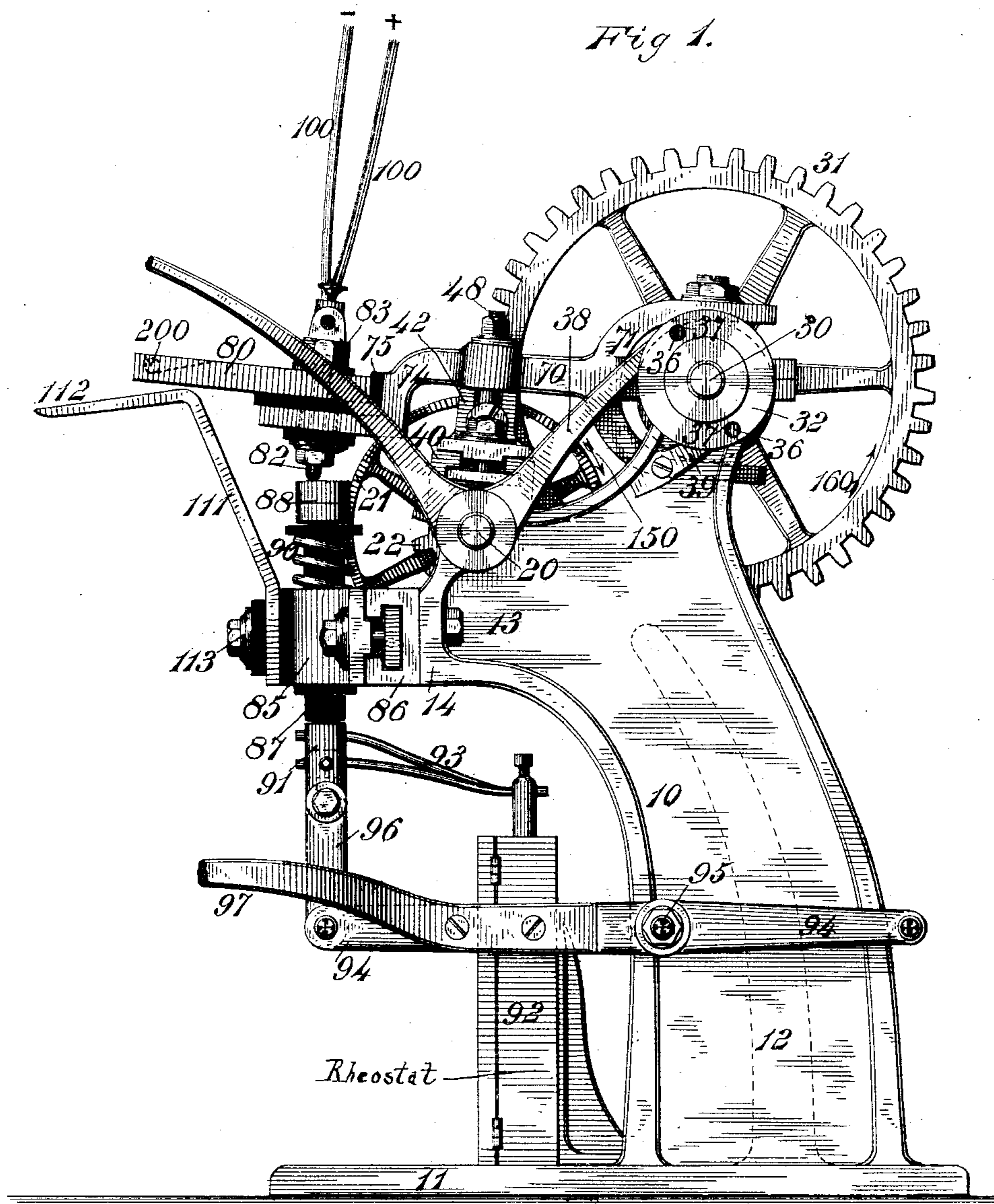
(No Model.)

4 Sheets—Sheet 1.

G. D. BURTON & E. E. ANGELL.  
ELECTRIC BLANK HEATER FOR FORGING MACHINES.

No. 444,914.

Patented Jan. 20, 1891.



WITNESSES

*Harry King*  
*R. E. Somes.*

INVENTORS:

*George D. Burton*  
*Edwin E. Angell*  
*B. F. Somes, Attorney*

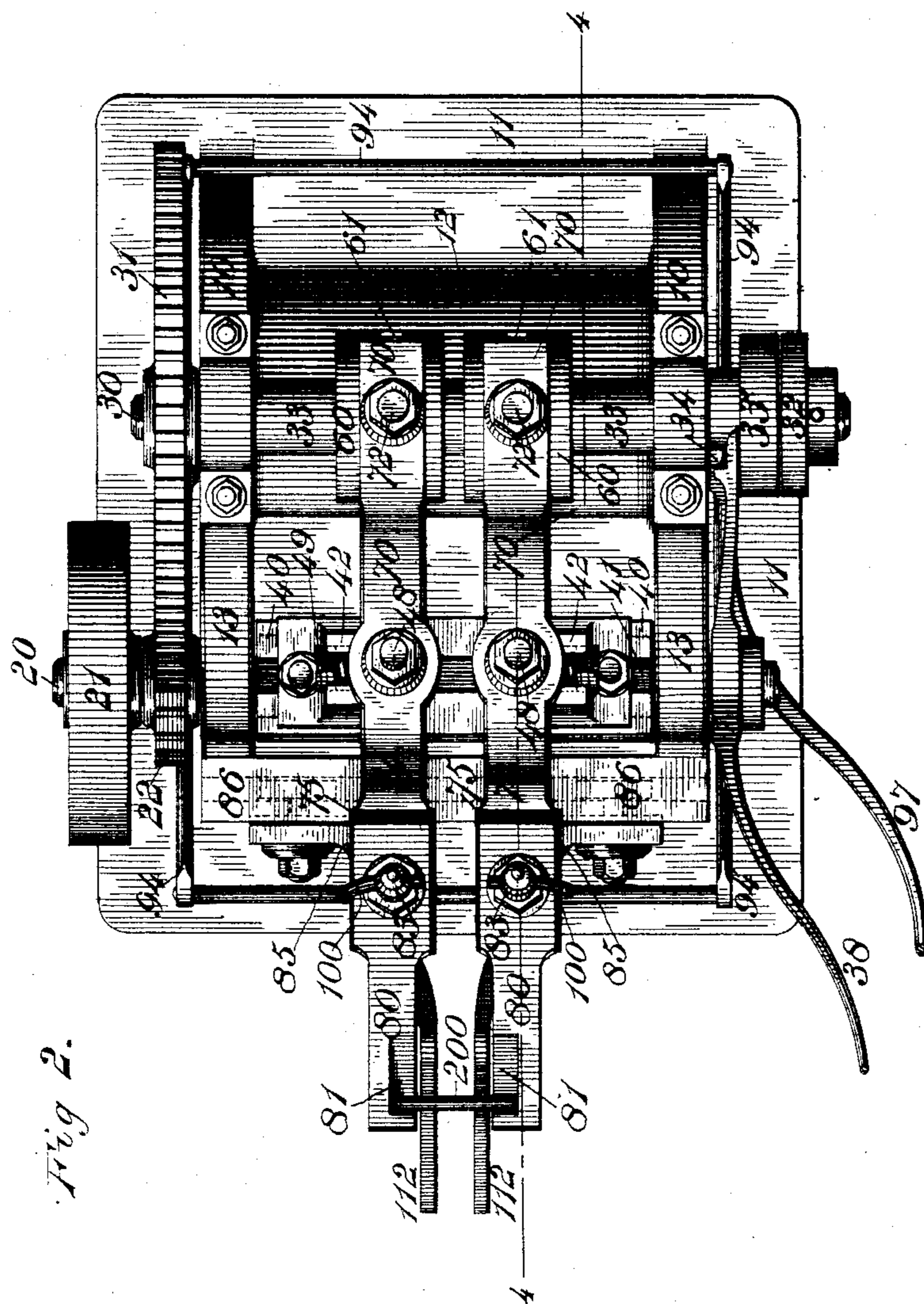
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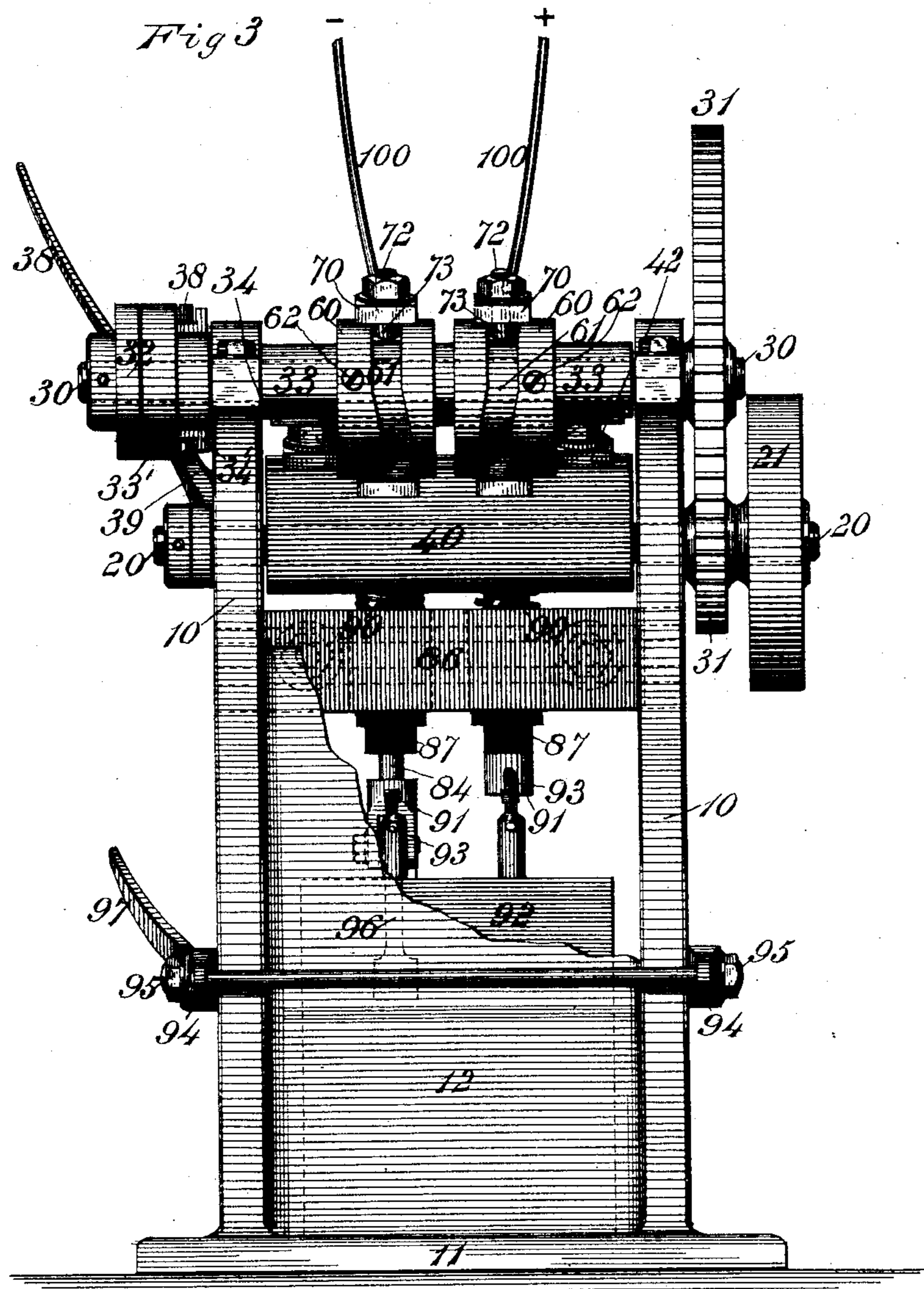
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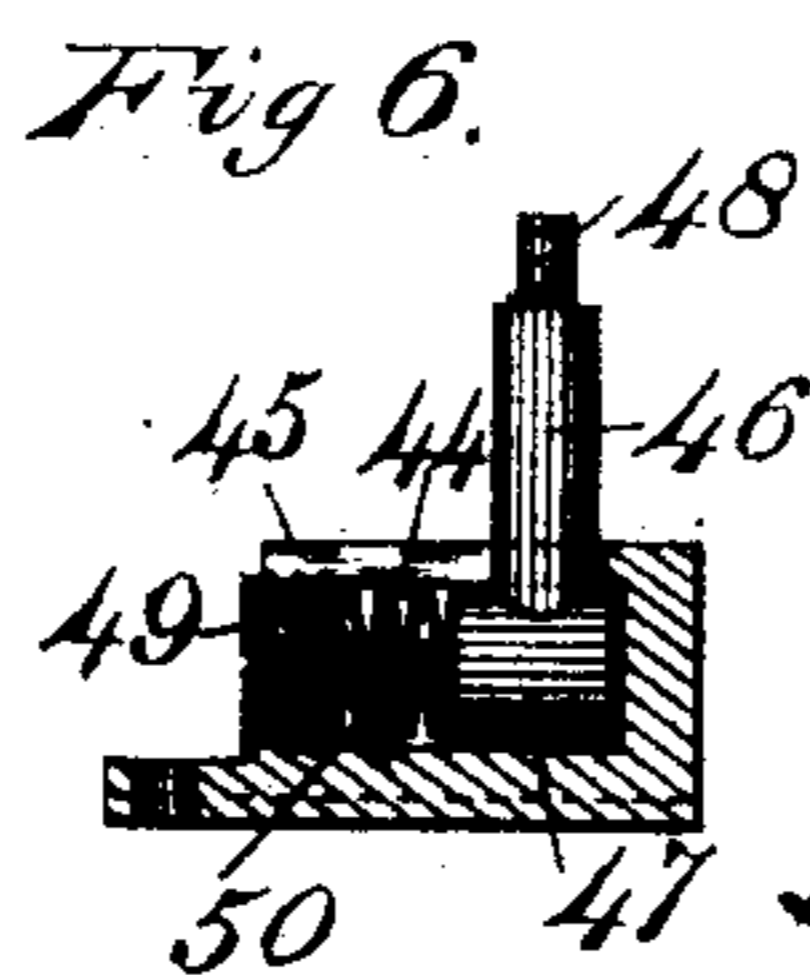
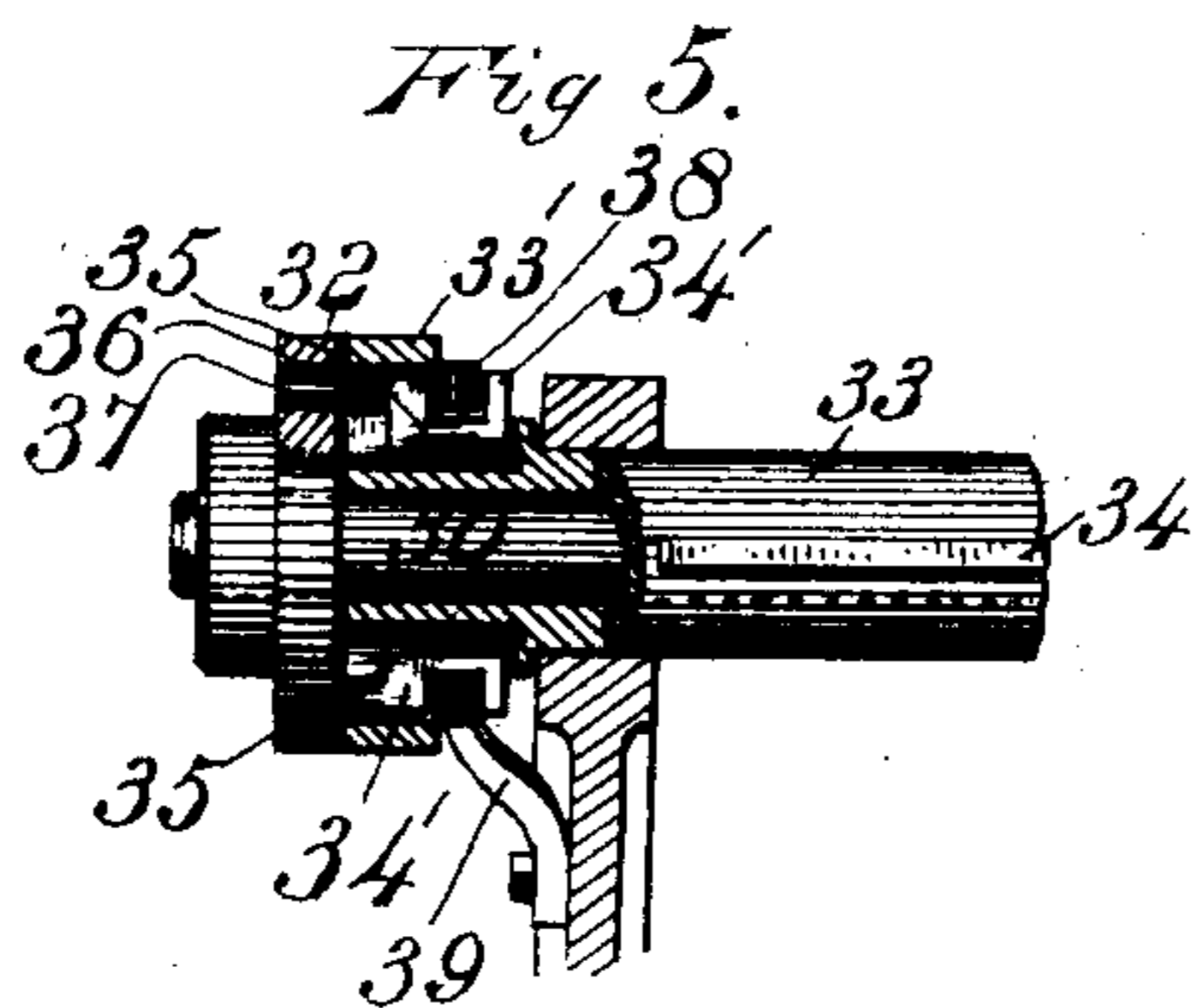
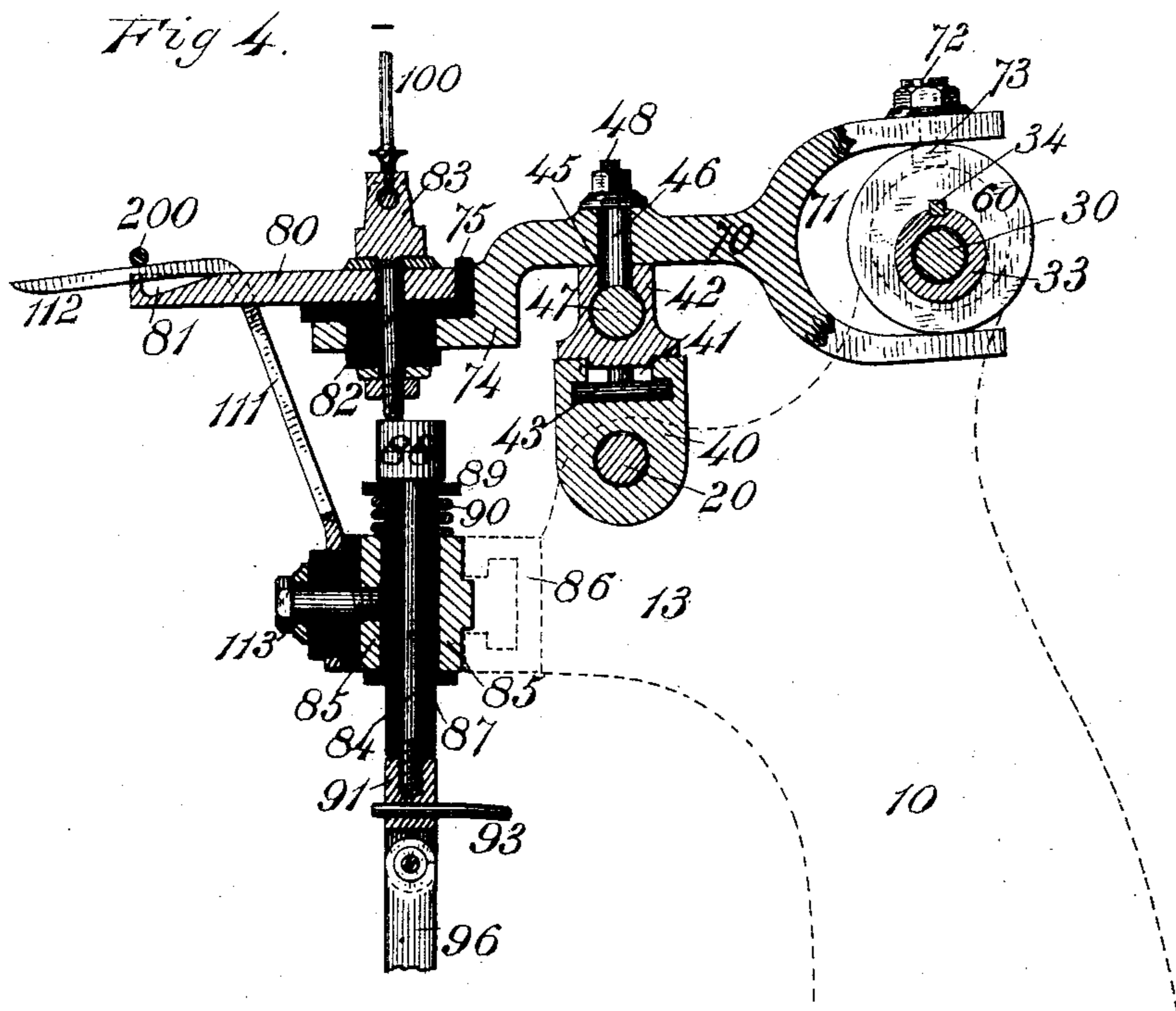
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# UNITED STATES PATENT OFFICE.

GEORGE D. BURTON, OF BOSTON, AND EDWIN E. ANGELL, OF SOMERVILLE,  
MASSACHUSETTS, ASSIGNORS TO THE ELECTRICAL FORGING COMPANY,  
OF MAINE.

## ELECTRIC BLANK-HEATER FOR FORGING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 444,914, dated January 20, 1891.

Application filed October 7, 1890. Serial No. 367,356. (No model.)

*To all whom it may concern:*

Be it known that we, GEORGE D. BURTON, a citizen of the United States, residing at Boston, in the county of Suffolk, in the State of Massachusetts, and EDWIN E. ANGELL, a citizen of the United States, residing at Somerville, in the county of Middlesex, in the State of Massachusetts, have invented certain new and useful Improvements in Electric Blank-Heaters for Forging-Machines, of which the following is a specification.

This invention relates to an electric heater for use in connection with a forging-machine for heating to a forging temperature blanks for the manufacture of forgings.

The object of the invention is to provide a simple and effective apparatus for this purpose in which the electrodes and their co-operative parts are adjustable to suit blanks of different lengths for the manufacture of forgings of different sizes, in which said electrodes are adapted to automatically grasp and release the blanks with facility, and in which said electrodes are under the control of the operator for determining the heating periods.

Figure 1 of the accompanying drawings represents a side elevation of this improved electric blank-heater. Fig. 2 represents a plan thereof. Fig. 3 represents a rear elevation thereof, a portion of the back plate being broken out. Fig. 4 represents a vertical longitudinal section on line 4 4 of Fig. 2. Fig. 5 represents a detailed view of the cam-sleeve for controlling the electrodes. Fig. 6 represents a detailed view of an adjustable pivot for one of the electrodes.

Similar numerals of reference indicate corresponding parts in the different figures.

The frame of this electric heater comprises two standards 10, a base-plate 11, and a back plate 12, all of which may be cast in one piece. These standards are provided near their upper ends with short brackets 13, having vertical front faces 14. A driving-shaft 20 has its bearings in the brackets 13 of the standards, and a counter-shaft 30 has a bearing at one end in the upper end of one of the standards, being supported at the other end in a sleeve hereinafter described, which has a bearing in

the opposite standard. The driving-shaft 20 is provided with a driving-pulley 21 and with a pinion 22, which meshes with a gear-wheel 31 on the counter-shaft. An oscillating guideway 40 is supported between the standards on the driving-shaft 20. This guideway is provided with a longitudinal guide-groove 41. Two adjustable pivot-blocks 42 are disposed on said guideways, said blocks being provided with guides 43, which engage said groove. Each of these blocks is also provided with a horizontal socket 44 and with a slot 45 along its top opening into said socket. Pivot-pins 46 are disposed in said blocks. Each of these pivot-pins is provided at its lower end with a cylindrical foot 47 at right angles to its body and at its upper end with a screw-threaded tang 48. The cylindrical foot fits in the horizontal socket 44 and the body of the pin plays in the slot in said block. The outer end of said socket is closed by a screw 49, and a spiral spring 50 is disposed in said socket between said screw and the pivot-pin.

A sleeve 33 is disposed on the shaft 30 and extends through one of the standards 10. This sleeve is provided with a feather 34. A clutch mechanism, one member of which is rigidly attached to the shaft and the other to the sleeve, serves to connect the sleeve with the shaft and disconnect it therefrom. The clutch comprises a disk 32, fixed to the shaft, and a disk 33', fixed to the sleeve. The disk 32 is provided with slots 37 at diametrically-opposite points, and the disk 33' is provided with slots 36, also at diametrically-opposite points, in which are disposed the sliding dogs 34'. These dogs are normally forced outward by the springs 35, and are adapted to engage the slots 37 in the disk 32 for locking the disks together. The dogs are provided with recesses at their rear ends, which are engaged by the lever 38 on the upper side of the shaft, and by the cam 39, attached to the frame on the under side of the shaft. The disks are clutched and unclutched by means of the lever 38, which controls the dogs. The cam 39 prevents the engagement of the dogs at the lower side of the shaft, and the plurality of slots permits one or more

stops to each revolution. This clutch is the same as that used on ordinary punch-presses, which effect stops during a revolution.

Two eccentrics 60, provided with peripheral cam-grooves 61, are disposed on the sleeve 33, being locked against rotation thereon by the feather 34. These eccentrics are adjustable on said sleeve by means of set-screws 62.

Two levers 70 are pivoted on the adjustable pivot-pins 46. These levers are provided with vertical forks 71 at their rear ends, which engage the peripheral faces of the eccentrics 60 for imparting a vertical oscillation to said levers, and the upper arms of these forks are provided with pins 72, carrying friction-rollers 73, which project into the cam-grooves 61 for imparting a lateral oscillation to said levers.

Any equivalent horizontal oscillator or vertical oscillator may be employed in lieu of the oscillating mechanism above described for imparting vertical and horizontal oscillations to the electrodes. The front ends of these levers are provided with angular arms 74, having insulated faces 75.

Two electrodes 80, composed of copper or other highly-conductive material, are supported at their rear ends on said insulated arms. These electrodes extend parallel with each other when in normal position, and are provided near their front ends with recesses 81, cut into their upper and inner faces, said electrodes serving to support the blank 200 to be heated, the opposite ends of said blank resting in said recesses. The electrodes are clamped at their rear ends to the insulated arms 74 by means of bolts 82, which pass vertically through said electrodes and through said arms, being insulated from the latter. These bolts are provided with binding-posts 83 at their upper ends, to which the wires or cables 100 of the electric circuit are attached. These bolts serve as conductors for the electric current, and their lower ends rest upon vertically-movable contact-pins 84, which pass through sockets 85. These sockets are laterally adjustable in a transverse guideway 86, extending between the standards. Sleeves 87 serve to insulate said pins from their sockets. These pins are provided with heads 88 at their upper ends, and the insulating-sleeves with flanges 89 below said heads. Springs 90 are interposed between the upper ends of the sockets and said flanges and tend to hold said pins in contact with the bolts 82 of the electrodes. The contact-pins are screw-threaded at their lower ends and provided with binding-posts 91. A rheostat 92 is connected by wires or cables 93 with the binding-posts 91, attached to the lower ends of the contact-pins. A lever-frame 94 is pivoted to opposite sides of the frame at 95 and connected with the binding-post of one of the sliding contact-pins by means of a link 96. This frame is provided with a foot-lever 97, by the depression of which one of the contact-pins 84 is

withdrawn from its bolt 82, and the circuit is broken.

Feeders for feeding the blanks from the electrodes to the forging-dies (not shown in the drawings) are attached to the heater. The feeders herein shown comprise two bent strippers, each consisting of an approximately vertical arm 111 and an approximately horizontal arm 112. These strippers are attached at the lower ends of their vertical arms by bolts 113 to the vertical sockets 85 of the sliding contact-pins, and are insulated from said sockets. The upper approximately horizontal arms of these strippers are disposed parallel with each other in vertical planes passing between the electrodes, and serve to release the blank from the electrodes as the electrodes are depressed, and as inclined planes to conduct said blank to the forging-dies.

The operation of the apparatus is as follows: The parts being in the position illustrated in Fig. 1, a blank 200 is disposed between the electrodes, its ends resting in the recesses 81. The blank serves as a conductor for closing the circuit between the electrodes, one of which is positive and the other negative. This closing of the circuit causes a current of large volume to pass through the blank, the resistance of which is greater than that of the electrodes, and heat sufficient to soften the blank is quickly generated. The driving-shaft 20, revolving in the direction of the arrow 150, causes the gear-wheel 31 to revolve in the direction of the arrow 160, and the parts of the clutch 32 being in gear the sleeve 33 and its eccentric grooved cams 60 are rotated. The cam-grooves 61 therein impart a horizontal oscillation to the levers 70 on their pivots 46 and cause the electrodes to move apart from each other sufficiently to release the pressure thereof upon the ends of the blank, and at the same time the peripheral action of the cams raises the outer ends of the levers 70 and depresses the electrodes below the plane of the stripper-arms 112, whereby the blank 200 is deposited on said arms. The blank then rolls down these inclined arms to the forging-dies. As the sleeve 33 continues to revolve, the electrodes are raised and another blank is fed thereto in any suitable manner or by any suitable means and deposited with its ends resting in the recesses 81. The cam-grooves then swing the electrodes toward each other and bring the sides or flanges of the recesses into contact with the ends of the blank, so that the extreme ends thereof will receive the heating-current. The adjustable spring-pressed pivot-pins 46 of the levers 70 cause a yielding contact of the electrodes with the blank and permit said electrodes to adjust themselves to blanks for the same purpose, which may vary somewhat in length. When it is desired to change the length of the blanks for different-sized forgings, the levers 70, carrying the electrodes 80,

are adjusted toward or from each other by the adjustment of the pivot-blocks 42 on the oscillating guideway 40. The eccentric cams 60 are correspondingly adjusted on the sleeve 33 and the contact-pins 84 are also adjusted to suit the changed position of the electrodes by the adjustment of the sockets 85 on the guideway 86. This adjustment of the sockets also adjusts the strippers when the latter are attached to the sockets, as shown; but adjustment of the strippers is not necessary to the proper working of the apparatus.

By means of the lever 38 the parts of the clutch 32 may be unclutched and the motion of the sleeve arrested, whereby the blank may be held in the electrodes for any desired length of time.

We claim as our invention—

1. In an electric blank-heater, the combination of two electrodes adapted for holding a blank to be heated, and vertical and horizontal oscillators for imparting vertical and horizontal oscillation to said electrodes.

2. In an electric blank-heater, the combination of two levers carrying electrodes adapted for holding a blank to be heated, a guideway, and pivot-blocks adjustable in said guideway and provided with pivot-pins for said levers.

3. In an electric blank-heater, the combination of pivot-blocks, pivot-pins adapted to slide in said blocks, springs for affording an elastic adjustment of said pivot-pins, and electrode-levers fulcrumed on said pivot-pins.

4. In an electric blank-heater, the combination of two pivoted levers provided with electrodes adapted for holding a blank to be heated, oscillating supports for the pivots of the levers, and eccentric disks provided with peripheral cam-grooves engaging said levers for imparting vertical and horizontal oscillations thereto.

5. In an electric blank-heater, the combination of a frame, an oscillating guideway disposed therein, pivot-blocks adjustable on said guideway, pivot-pins disposed in said blocks, levers fulcrumed on said pivot-pins and provided with forks at their rear ends and electrodes at their front ends, and eccentric cams provided with grooves engaging said levers.

6. In an electric blank-heater, the combination of an oscillating guideway, pivot-blocks adjustable in said guideway and provided with pivot-pins, and levers fulcrumed on said pivot-pins.

7. In an electric blank-heater, the combination of two levers carrying electrodes adapted for holding a blank to be heated and provided with forked ends having pins, and eccentric cams engaging said forked ends and provided with cam-grooves engaged by said pins.

8. In an electric blank-heater, the combination of two levers carrying at one end electrodes adapted for holding a blank to be heated and provided with forked extensions at their opposite ends, adjustable pivots for said levers, a feathered sleeve, and cams adjustable on said sleeve engaging the forked ends of said levers.

9. In an electric blank-heater, the combination of two levers carrying at one end electrodes adapted for holding a blank to be heated and provided with forked extensions at their opposite ends, adjustable pivots for said levers, a feathered sleeve, cams adjustable on said sleeve engaging the forked ends of said levers, and adjustable contact-pins for the electrodes.

10. In an electric blank-heater, the combination of two levers carrying at one end electrodes adapted for holding a blank to be heated and provided with forked extensions at their opposite ends, adjustable pivots for said levers, a feathered sleeve, cams adjustable on said sleeve engaging the forked ends of said levers, adjustable contact-pins for the electrodes, a shaft within said sleeve, a clutch mechanism for connecting said sleeve and shaft, and a lever for unclutching the clutch mechanism and arresting the motion of the sleeve.

11. In an electric blank-heater, the combination of the lever 70, having the arms 74, the electrodes 80, disposed on said arms and insulated therefrom, the bolts 82, clamping said electrodes to said arms and provided with binding-posts at their upper ends, and spring contact-pins 84 for contact with said bolts.

12. In an electric blank-heater, the combination of a guideway 86, the sockets 85 adjustable therein, and the spring contact-pins 84, supported in said sockets.

13. In an electric blank-heater, the combination of the sockets 85, spring contact-pins 84, disposed therein, and a foot-lever connected with one of said contact-pins for depressing it to break the contact.

14. In an electric blank-heater, the combination of two electrodes adapted for holding a blank to be heated, strippers disposed in vertical planes passing between said electrodes, and means for depressing said electrodes below the strippers.

In testimony that we claim the invention above set forth we affix our signatures in presence of two witnesses.

GEORGE D. BURTON.  
EDWIN E. ANGELL.

Witnesses:

CHESTER MARR,  
E. F. PHILIPSON.