

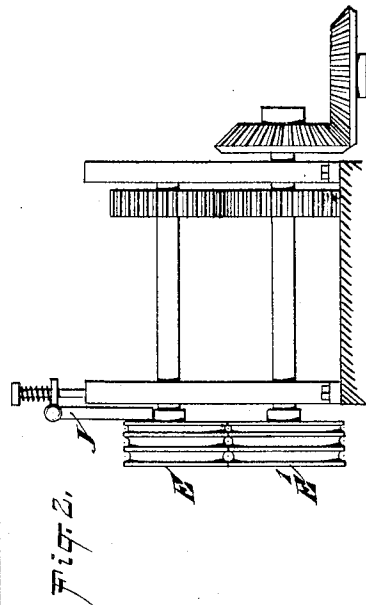
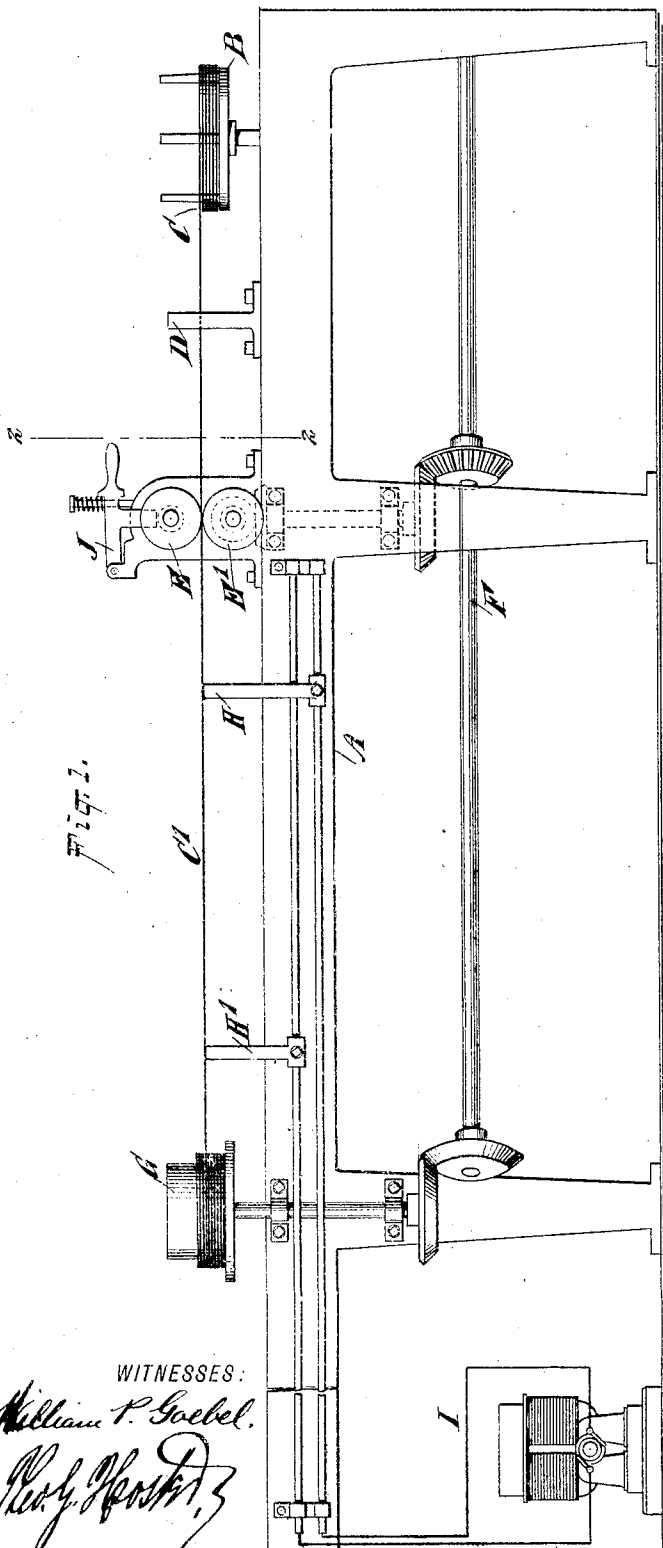
(No Model.)

2 Sheets—Sheet 1.

C. P. TURNER.  
ANNEALING APPARATUS.

No. 578,170.

Patented Mar. 2, 1897.



WITNESSES:

*William P. Gaebel.*  
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(No Model.)

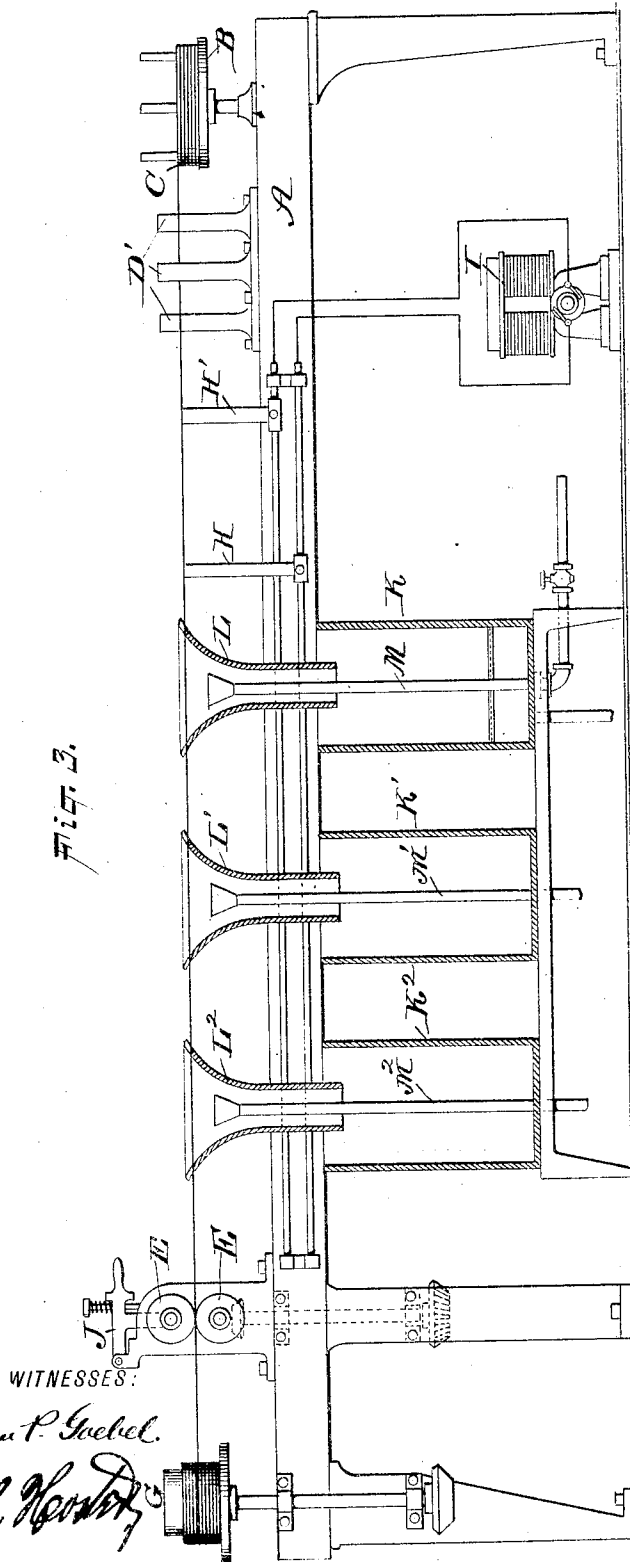
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Fig. 3.



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# UNITED STATES PATENT OFFICE.

CHARLES P. TURNER, OF NEW YORK, N. Y., ASSIGNOR TO HIMSELF, AND  
JOHN H. BOLLES, OF COLORADO SPRINGS, COLORADO.

## ANNEALING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 578,170, dated March 2, 1897.

Application filed February 8, 1896. Serial No. 578,541. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES P. TURNER, of New York city, in the county and State of New York, have invented certain new and useful Improvements in Annealing, of which the following is a full, clear, and exact description.

The object of the invention is to provide certain new and useful improvements in annealing wire and the like by electricity, so that the wire is evenly heated to prevent the formation of hard spots or the entire destruction of the wire, as so frequently occurs in the methods now in use.

The invention consists of certain parts and details and combinations of the same, as will be fully described hereinafter and then pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is side elevation of the apparatus. Fig. 2 is an enlarged transverse section of the same on the line 2 2 of Fig. 1; and Fig. 3 is a side elevation of another form of the apparatus, parts being shown in section.

In the process now employed for annealing wire the latter is placed in hanks or coils in a pan or upon the floor of the annealing-furnace and then subjected to a heat sufficient for annealing the wire and softening it to such a degree as to permit of drawing the wire down to the required gage without breaking it. This method is very difficult, as the wire, on account of being in hanks or coils, has parts lying one on the top of the other, so that the exposed parts are overheated and the contacting parts cannot be sufficiently heated to anneal the wire. The portions overheated lose their strength, while the other parts remain quite hard and are apt to break while being drawn through the dies, and in some cases the wire is overheated to such an extent that the coils are melted.

With the method and apparatus presently to be described in detail I completely avoid the above-mentioned difficulties and produce a wire of uniform quality throughout.

In order to carry the method into effect, I prefer to use the apparatus shown in Figs. 1

and 2, in which a suitably-constructed frame A carries at one end a spool B, on which the wire C is coiled and from which the wire passes through the draw-plate or die D to and between a pair of feed or friction rolls E E', driven from the main driving-shaft F by suitable gearing and shafts, as indicated in the drawings. This shaft F, by means of a friction-gear, also rotates a drum G, arranged at a suitable distance from the feed-rolls E and on which the wire is wound up after it has passed over two contact-plates or electrodes H H', arranged between the feed-rolls E E' and the drum G. The contact-plates H H' are in an electric circuit, receiving its electrical supply from a suitable battery, dynamo I, or other means.

Now it will be seen that when the machine is set in motion the wire is fed by the feed-rolls E E' forwardly over the contact-plates H H', whereby that part of the wire between the contact-plates closes the circuit and is consequently subject to the action of the electricity in the circuit, so that this part of the wire is annealed. The contact-plates H H' are longitudinally adjustable, so that the distance between the contact-plates may be increased or diminished to give the desired resistance to the electricity and insure a proper heating of that part of the wire between the plates, according to the strength of the current and the thickness and nature of the wire.

The pinch or bite of the feed-rolls E E' is controlled or adjusted by a lever J or other suitable means, so as to exert sufficient power or force on the feed-rolls to draw the wire through the draw-plate or die D and at the same time not abrade or injure the surface of the wire.

In Fig. 3 the apparatus is shown as provided with a series of draw-plates or dies D' (in train) of different sizes, so that the wire may be drawn to the required size and also be reannealed at any stage of the process necessary. As shown in the drawings, this form of apparatus is provided with a series of vats or tanks K K' K<sup>2</sup>, and funnels L, L', and L<sup>2</sup> are located at the upper part of the tanks. The wire passes over the contact-plates H H' and through slots or grooves formed in opposite sides of the funnels at the top. While

passing over the tank K the wire is subjected to the action of cold water, which is forced through pipe M and coming in contact with the heated wire cools and scales it. The wire then passes over the tank K' and is subjected to the action of dilute acids forced through the pipe M' for the purpose of pickling the wire, and the wire is then subjected to the action of hot water forced through the pipe M<sup>2</sup> while the wire is passing over the tank K<sup>2</sup>, the water washing off the acid from the surface of the wire.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

1. In an annealing apparatus for wire and the like, mechanism for feeding the wire over the contact-plates, the said mechanism comprising a spool on which the wire is coiled a revoluble drum on which the wire is wound, a vertically-arranged shaft carrying the said drum, feed-rolls for drawing the wire from the spool, horizontally-arranged shafts carrying the said feed-rolls and provided with gear-

wheels meshing with each other, a vertically-arranged shaft provided with a bevel gear-wheel engaging a bevel-gear on the shaft of the lower feed-roll, a main driving-shaft for imparting motion to the said vertically-arranged shafts, and means for controlling the bite of the feed-rolls on the wire, substantially as shown and described.

2. An annealing apparatus for wire and the like comprising a wire-feeding device, contact-plates over which the wire is fed by such feeding device, the said contact-plates being connected with an electric-current generator, and means for subjecting the wire successively to the action of water, dilute acid, and water, after passing over the contact-plates, whereby the wire is cooled and scaled, pickled, and the acid washed from the surface thereof, substantially as described.

CHARLES P. TURNER.

Witnesses:

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