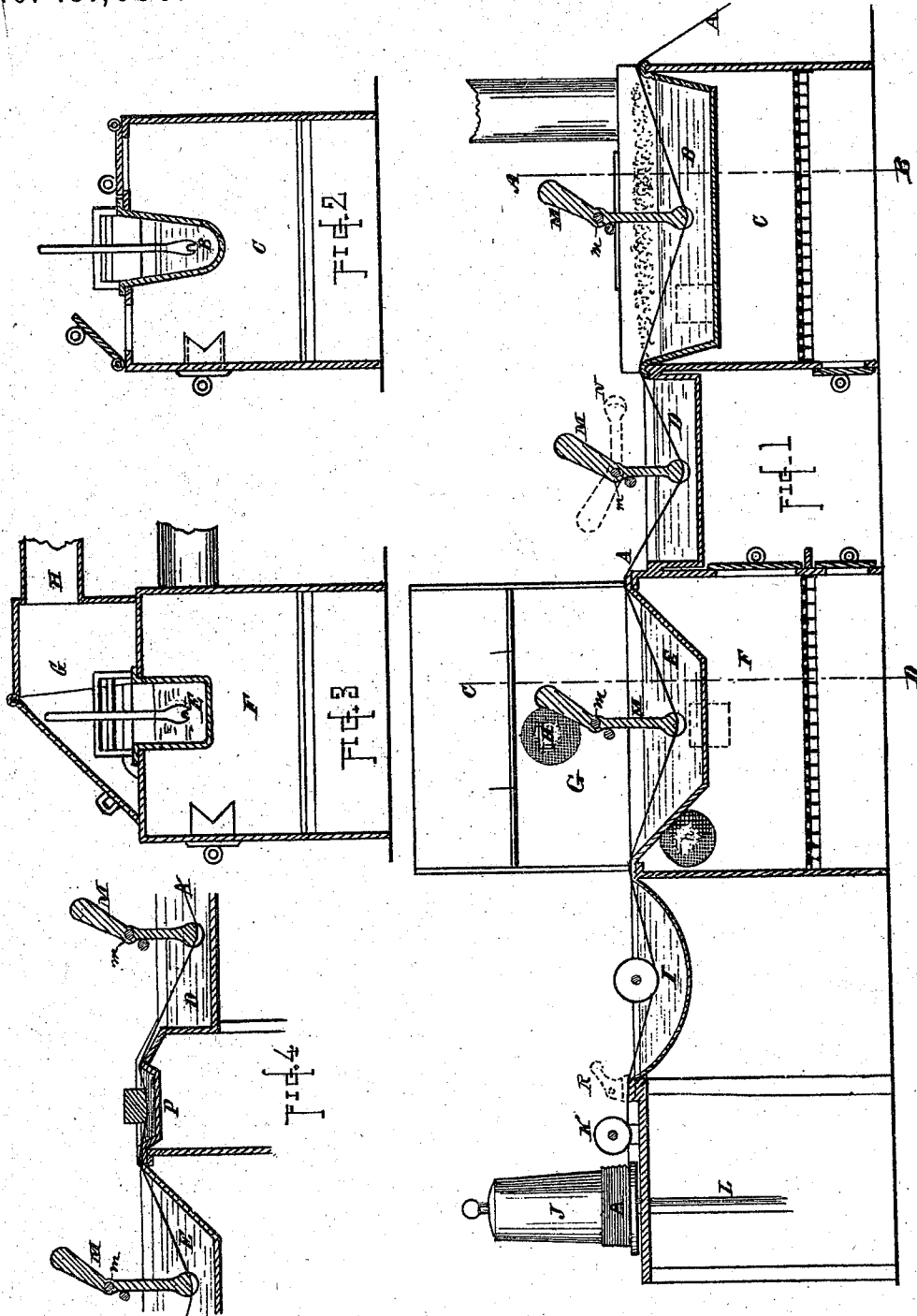


E. H. HILL.

Improvement in Annealing and Tinning Wire.

No. 131,680.

Patented Sep. 24, 1872.



Witnesses

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IMPROVEMENT IN ANNEALING AND TINNING WIRE.

Specification forming part of Letters Patent No. 131,680, dated September 24, 1872.

CASE A.

To all whom it may concern:

Be it known that I, EDWIN H. HILL, of the city and county of Worcester and Commonwealth of Massachusetts, have invented certain new and useful Improvements in the Process of Annealing and Tinning Wire; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing which forms a part of this specification, and in which—

Figure 1 represents a central longitudinal section of apparatus for annealing and tinning wire in accordance with my improved process; Fig. 2 represents a transverse vertical section of the annealing apparatus; Fig. 3 represents a transverse vertical section of the tinning apparatus; and Fig. 4 represents a longitudinal section of an additional bath or modification of the apparatus, which may sometimes be desired.

This invention relates to certain improvements in the manufacture of tinned wire; and consists in a process of annealing and tinning, as hereinafter described, by one continuous and combined operation.

In the drawing, the part marked A represents the wire, which is first drawn from a suitable supporting-reel (not shown) through a vat of melted lead, B, which is kept at a constant degree of temperature by a fire in the furnace C beneath the vat. The surface of the melted lead may also be covered with fine charcoal to prevent oxidation of the lead, to protect the heated wire from the effect of the air, and to increase the heat at the surface of the lead. In passing through the charcoal and melted lead the wire becomes annealed, and it is then drawn through a vat of diluted muriatic acid, D, which is arranged in close proximity to and in line with the annealing-bath B. The acid cleans the surface of the wire, which, after leaving the acid-bath, is drawn through a vat of melted tin, E, arranged over a furnace, F, so as to be kept at a proper degree of temperature, and covered by a hood, G, having a flue, H, to convey the acid-fumes away to the chimney. The wire leaves the tinning-bath E with its surface coated with

tin, and it is then drawn through a bath of clear water, I, by means of which the wire is cooled, after which it is wound in a finished condition upon the cylinder J, and from the cylinder it is removed in suitable-sized coils, which are properly tied and packed for shipment. A friction-roll is arranged at K, around which the wire passes, and suitable mechanism connected therewith for retarding its motion, so that the wire will be wound upon the cylinder J with the proper degree of tension. Operating mechanism is to be combined with the spindle L of the cylinder J for revolving said cylinder and drawing forward the wire through the various baths. The wire is, in the present instance, held beneath the surface of the various baths by means of pressers M, which have grooves in their lower ends to guide the wire, and which are pivoted to supporting-bars *m* in such a manner that they can be swung up, (as shown at N in dotted lines,) and the wire raised from the baths. If preferred, other mechanism may be used for holding the wires beneath the surface of the baths. If desired, a bath, P, of muriate of zinc, may be arranged between the acid-bath D and the tin-bath E, as illustrated in Fig. 4. A wiper may be used, as at R, for removing the water from the surface of the wire as it leaves the bath I. This wiper may be composed of cotton-waste or similar material, fixed in a suitable frame, and clamped down upon the wire with the required pressure.

The furnaces, vats, and other mechanism may be constructed as described in my application for Letters Patent for improved apparatus for annealing and tinning wire, of even date herewith, or their form may be somewhat varied, provided the process is substantially the same, the essential features of said process being, first annealing the wire by passing it through a bath of melted lead, then through diluted muriatic acid or muriate of zinc, or both, and then through a bath of melted tin, after which it is cooled and coiled in a suitable manner, the entire process being performed in one continuous and combined operation.

The advantages derived from my improved process of annealing and tinning, are, first,

great economy of time and labor over the ordinary method; and, second, the wire is left with a smooth and even surface, and in a much softer and more pliable condition than wire produced by the ordinary method, which method is to place the wire in close annealing-pots and subject it to heat within a furnace for about twenty-four hours; then, after removing it from the furnace and allowing it to cool gradually, the wire is taken from the pot and dipped in boiling diluted sulphuric acid, to clean or scale its surface; it is then placed in a liquor composed of rye-meal and water to prevent it from rusting, and afterward drawn through suitable dies to produce the required size, it being passed through from one to four dies, according to the size to which it is required to reduce the wire. After drawing, it is passed through a bath of muriate of zinc, and then through a bath of melted tin. This old process is long and laborious, and the wire, owing to its being drawn through the dies after it has been annealed, and before it is tinned, is rendered stiff and hard, which is an objection that it is desirable to obviate, and which objection is obviated by my improved process of annealing and tinning; and the wire produced thereby is soft and pliable, as above stated, thereby rendering it more desirable for the manufacture of wire-cloth, in the construction of which large quantities are annually used with a constantly-increasing demand. Also, for covering the bass-strings of pianos and similar instruments the soft and pliable wire is preferable, as it hugs closer and winds more uniformly upon the central wire, while the strings formed of soft wire produce a clearer and more perfect tone than do those wound

with a stiff wire, which is liable to spring away from the central wire and produce a jarring tone when the string is vibrated. This clearness of tone is important; and copper wire has heretofore been much used for the purpose of winding the strings, owing to its extreme pliability; but it has been found upon trial that tinned iron wire, made by my improved process, above described, is a superior article for the purpose, and large quantities are at present being used therefor.

It will be understood that wire can, with equal facility, be coated with zinc by means of this process, the only change necessary being to substitute zinc in place of tin in the bath E.

I am aware that it is not new to draw wire in a heated state from the annealing-oven directly into the cleaning-bath, and thence, when the galvanizing is to be done, directly into the bath of molten metal, such process having been described and claimed in the patent of G. Bedson, No. 37,669, of February 17, 1863; and this, therefore, I do not claim; but

Having described my improved process of annealing and tinning wire, what I claim therein as new and of my invention, and desire to secure by Letters Patent, is—

1. The process of annealing and tinning wire by one continuous and combined operation, substantially as above described.

2. The process of annealing wire with a combined lead and charcoal bath, substantially as set forth.

EDWIN H. HILL.

Witnesses:

THOS. H. DODGE,
CHAS. H. BURLEIGH,