(No Model.) 3 Sheets—Sheet 1.

E. TUCKER, Jr.

APPARATUS FOR ANNEALING AND GALVANIZING WIRE.

No. 301,184. Patented July 1, 1884.

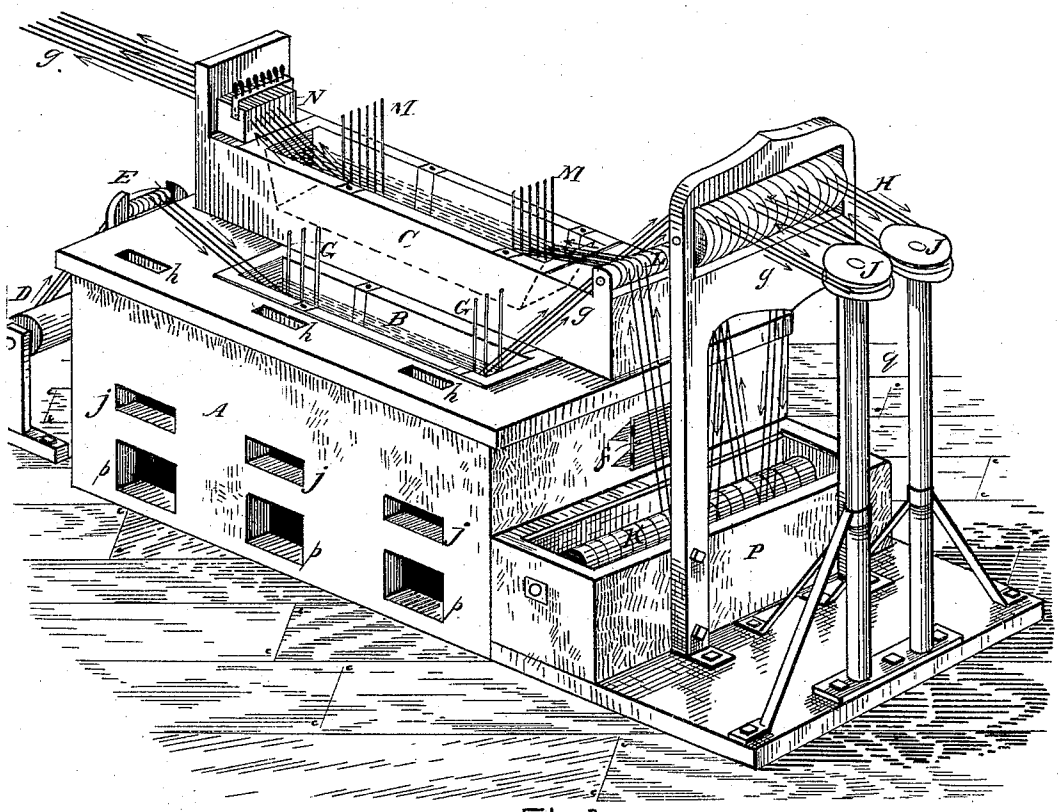
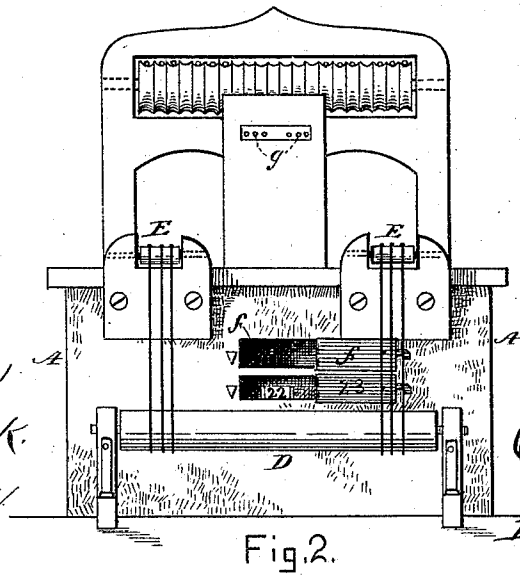


Fig. 1.



Witnesses.
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Fig. 2.

N. PETERS. Photo-Lithographer. Washington, D. C.

(No Model.) 3 Sheets—Sheet 2.

E. TUCKER, Jr.

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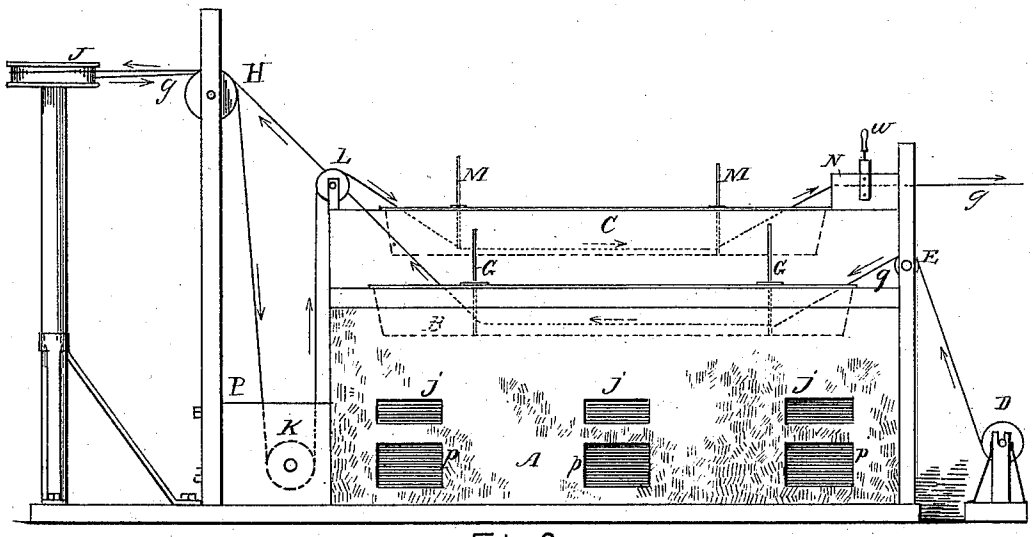


Fig. 3.

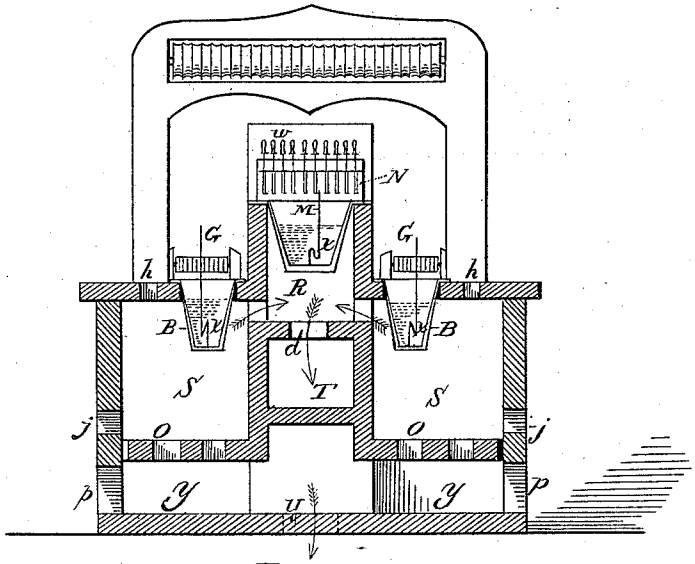


Fig. 4.

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(No Model.) 3 Sheets—Sheet 3.

E. TUCKER, Jr.

APPARATUS FOR ANNEALING AND GALVANIZING WIRE.

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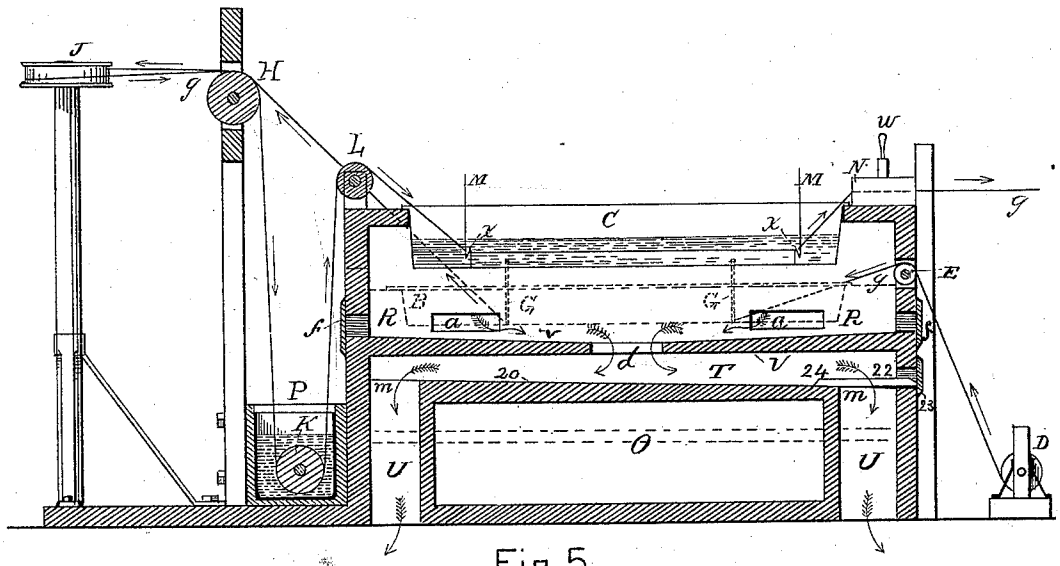


Fig. 5.

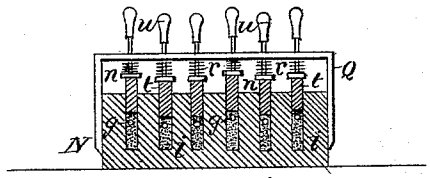


Fig. 6.

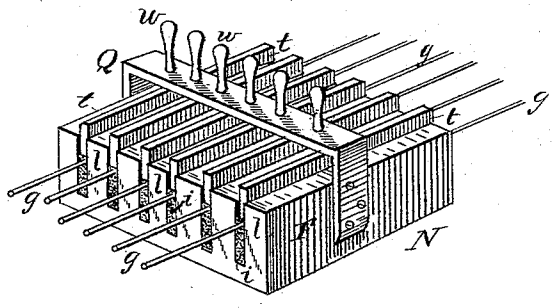


Fig. 7.

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UNITED STATES PATENT OFFICE.

EPHRAIM TUCKER, JR., OF WORCESTER, MASSACHUSETTS.

APPARATUS FOR ANNEALING AND GALVANIZING WIRE.

SPECIFICATION forming part of Letters Patent No. 301,184, dated July 1, 1884.

Application filed November 16, 1883. (No model.)

To all whom it may concern:

Be it known that I, EPHRAIM TUCKER, Jr., of Worcester, in the county of Worcester, State of Massachusetts, have invented a certain new and useful Improvement in Apparatus for Annealing and Galvanizing or Coating Wire, of which the following is a description sufficiently full, clear, and exact to enable any person skilled in the art or science to which said invention appertains to make and use the same, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 is an isometrical perspective view representing my improved apparatus in use; Fig. 2, an end elevation; Fig. 3, a side elevation; Fig. 4, a vertical transverse section; Fig. 5, a vertical longitudinal section; Fig. 6, an end elevation of the wiping-box, and Fig. 7 an isometrical perspective view of the same.

Like letters and figures of reference indicate corresponding parts in the different figures of the drawings.

My invention relates more especially to that class of annealing and galvanizing or coating apparatus which are employed in annealing and galvanizing or coating wire for wire fences, telegraphs, telephones, &c.; and it consists in a novel construction and arrangement of the parts, as hereinafter more fully set forth and claimed, by which a separate annealing-furnace is dispensed with, and a more effective device of this character produced than has heretofore been in ordinary use.

The nature and operation of the improvement will be readily understood by all conversant with such matters from the following explanation.

In the drawings, A represents the furnace, B B, the annealing pans or tanks, and C the coating-tank. The wires *g* to be annealed and galvanized or coated are wound upon a reel, D, Figs. 1 and 3, disposed near one end of the furnace, and pass upwardly over a series of sheaves or grooved pulleys, E, arranged on a plane above the top of the tanks B, thence downwardly under the guides G in said tanks, thence upwardly over the pulleys H, thence outwardly around the pulleys J, thence inwardly over the pulleys H, thence downwardly under the pulleys K, thence upwardly over the pulleys L, thence downwardly under the guides M in the tank C, and thence upwardly through the wiping-box N onto a receiving-reel, (not shown,) which may be located at any convenient distance from the furnace. The tanks B B contain the lead for annealing the wire, and the tank C the zinc galvanizing or coating material. In annealing the wires one-half of the same are conducted through each of the tanks B; but in coating or galvanizing them they are all returned through the tank C. A tank, P, containing the acid bath or flux, is disposed at the end of the furnace opposite the reel D, the pulleys K being so journaled in this tank as to submerge the wires passing under them, each wire being provided with an independent pulley, E, L, K, H, and J. The guides G M are secured to the bottoms of their respective tanks, as shown, (see Fig. 4,) and provided with bends *x*, under which the wires are passed, and by which they are kept submerged on their passage through the tanks.

The construction of the furnace will be best understood by reference to Figs. 4 and 5, in which O O represent the grates, one of which is disposed under each of the tanks B. The gases, smoke, heated air, and other products of combustion from the furnaces pass upwardly through the flues *a a*, disposed near the top at either end of the combustion-chambers S, thence to the center of the chamber R, beneath the tank C, thence downwardly through the diving-flue *d* in the bottom *v* of said chamber into the central chamber, T, thence toward either end of said last-named chamber, and downwardly through the diving-flues *m* into the flues U, which are connected with the chimney. (Not shown.) As the tank or pan C is liable to be destroyed, the intense heat to which it is subjected weakening its bottom and permitting the galvanizing metal to break through and fall upon the floor *v* of the chamber R, said floor is inclined from either end toward the center, for the purpose of catching the fluid escaping from the tank and conducting it safely through the flue *d* onto the floor 20 of the chamber T, this floor being inclined in such a manner as to conduct the fluid metal into the spout 22, from which it may pass outwardly through the opening 23 into any suit-

able vessel for receiving it. An opening, *f*, provided with a suitable door, leads into the chamber R at either end, for the purpose of enabling said chamber to be readily cleansed of soot, ashes, &c., an opening, 23, also serving a like purpose for chamber T, and having a door. (Not shown.) There is also an ash pit or chamber, Y, formed beneath the grates, and preferably extending from side to side of the furnace.

The construction of the wiping-box is best seen in Fig. 7, in which F represents the body of the box, and Q the truss. The body is provided on its upper side with a series of vertical longitudinal grooves, *l*, extending its entire length, and with a series of followers, *t*, beneath which the wiping material *i* is inserted. Each of the followers is provided with a pin, *w*, which passes downwardly through the top of the truss Q, and is threaded at its lower end and provided with a nut, *n*, the pin passing through the nut and into an unthreaded hole (not shown) in the top of the follower. A spring, *r*, is disposed around each of the pins *w*, beneath the truss Q, the upper end of the spring abutting against the under side of the truss, and its lower end resting on the upper side of the nut *n*, the spring acting expansively to force the followers *t* downwardly upon the wiping material *i* in the grooves *l*. The box is disposed at the end of the tank C, opposite the pulleys L, and the wires *g*, as they leave said tank, are passed through the wiping material *i* in the box, the wires being independently disposed, as shown in Fig. 7. The wiping material *i* may be composed of powdered talc, or sand and charcoal; but any other suitable material for that purpose may be used, if preferred.

It will be obvious that any degree of pressure may be placed upon the wires in the wiping-box by turning the pins *w* downwardly through their nuts *n*.

I do not confine myself to using independent sheaves or grooved pulleys E H J K L, or a pulley for each wire, although I deem the same preferable, as journaled drums or long rollers may be used instead of the pulleys. Neither do I confine myself to annealing and galvanizing or coating any specific number of wires at a time, as one or more wires may be treated, according to the capacity of the apparatus. The tank C is arranged centrally above the plane of the tanks B B, over the chamber R, enabling the smoke and other products of combustion to be concentrated in said chamber, thereby more effectively utilizing the heat before it passes downwardly through the flues *d m* and into the chimney. This arrangement of flues and tanks secures great economy of heat. A series of apertures, *h*, are provided in the top of the furnace above the chambers S, for introducing fuel, and are designed to be fitted with covers and dampers for regulating the draft. There are also a series of draft and clearing openings, *j*, in the sides of the furnace slightly above the plane of the grates O, and another series, *p*, below the grates, also designed to be fitted with proper dampers or doors. The pulleys J are journaled in vertical standards *q*, but may be supported in any other suitable manner and at any desired distance from the body of the furnace, it being understood that all of the pulleys, reels, and other parts described are to be suitably constructed and arranged to properly perform their respective functions. A guard, 24, is placed around the upper end of the flue *m* to prevent the fluid metal falling on the floor 20 from passing into said flue, and to direct it properly into the spout 22.

Having thus explained my invention, what I claim is—

1. In an apparatus for annealing and galvanizing or coating wire, the furnace A, provided with the chambers S S R T, flues *a d m* U, and grates O O, constructed and arranged to operate in combination with the tanks B C, substantially as specified.

2. In an apparatus for annealing and galvanizing or coating wire, the wiping-box N, consisting of the body F, provided with the grooves *l*, followers *t*, truss Q, and spring-pins *w*, combined and arranged to operate substantially as specified.

3. The improved annealing and galvanizing or coating apparatus herein described, the same consisting of the furnace A, reel D, pulleys E, tanks B B, guides G, pulleys H, pulleys J, tank P, pulleys K, pulleys L, tank C, guides M, and wiper or wiping-box N, constructed, combined, and arranged to operate substantially as set forth.

4. In an apparatus for annealing and galvanizing or coating wire, the inclined floor *v*, having the opening or flue *d*, through which the fluid metal may pass, in combination with the inclined floor 20 and spout 22, for receiving and conducting it out of the furnace, substantially as set forth.

5. The combination, in an annealing and tempering apparatus, of two combustion-chambers extending longitudinally of the furnace on each side thereof, annealing-tanks suspended over or into said combustion-chamber, an elevated longitudinal central flue into which the products of combustion pass from both said combustion-chambers, and a coating-tank located over said common central flue, substantially as described.

EPHRAIM TUCKER, JR.

Witnesses:
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ELMER G. TUCKER.