

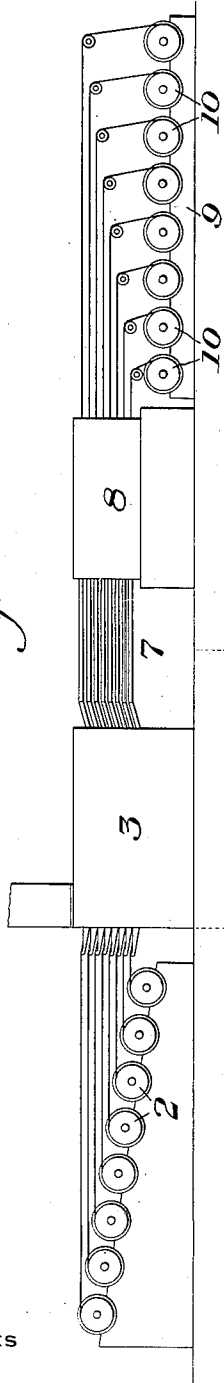
F. H. DANIELS.
 APPARATUS FOR ANNEALING FLATS AND OTHER SHAPES.
 APPLICATION FILED MAR. 6, 1909.

943,626.

Patented Dec. 14, 1909.

2 SHEETS—SHEET 1.

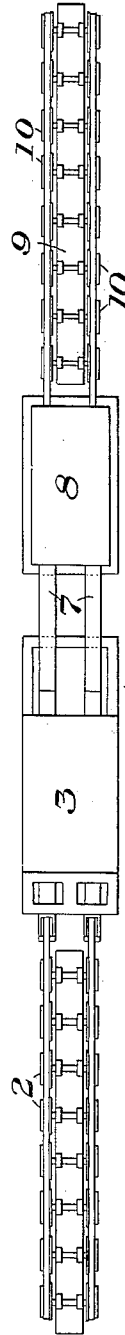
Fig. 1.



WITNESSES

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Fig. 2.



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Fig. 3.

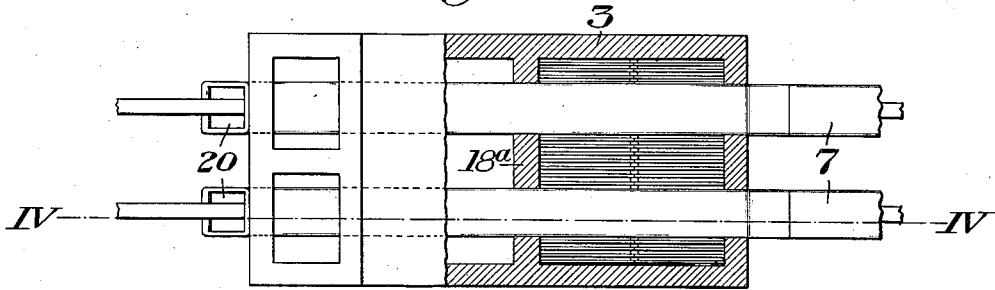


Fig. 4.

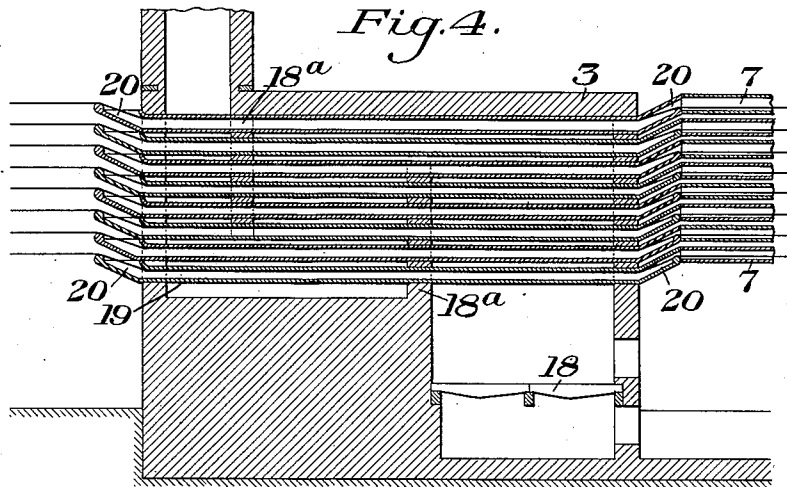
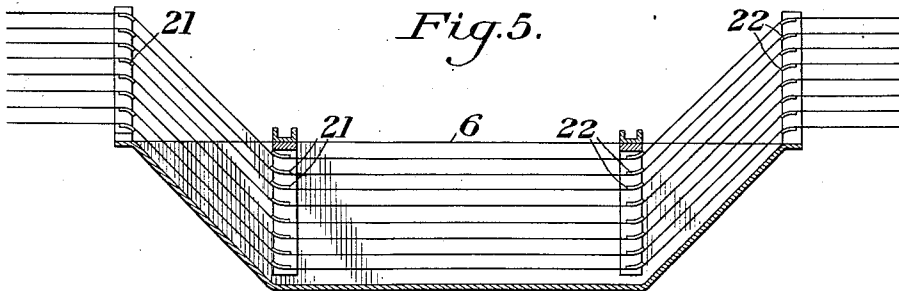


Fig. 5.



WITNESSES

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UNITED STATES PATENT OFFICE.

FRED H. DANIELS, OF WORCESTER, MASSACHUSETTS.

APPARATUS FOR ANNEALING FLATS AND OTHER SHAPES.

943,626.

Specification of Letters Patent.

Patented Dec. 14, 1909.

Original application filed December 8, 1908, Serial No. 466,472. Divided and this application filed March 6, 1909. Serial No. 481,594.

To all whom it may concern:

Be it known that I, FRED H. DANIELS, of Worcester, in the county of Worcester and State of Massachusetts, have invented a new and useful Improvement in Apparatus for Annealing Flats and other Shapes, of which the following is a full, clear, and exact description, reference being had to the accompanying drawing, forming part of this specification, in which:—

Figure 1 is a side view showing diagrammatically one form of apparatus embodying my invention; Fig. 2 is a plan view of the same; Fig. 3 is a horizontal section of one form of furnace; Fig. 4 is a vertical section of the same; Fig. 5 is a longitudinal sectional view showing another form of annealing apparatus.

My invention has relation to apparatus for annealing flats and other metal shapes and is especially applicable to shapes of long length and of various widths, and is designed to provide a continuous process, together with apparatus for carrying out the same, which will insure a uniform grade of material both physically and chemically. For round wire or narrow flats, common muffle or pot-annealing is more or less satisfactory in its results as the heat penetrates comparatively quickly through the coils. The wider, however, the section is, the longer it will take for the heat to penetrate the closely wound bundles, and when it cools off, the outer portions will cool much more quickly than the inner portions, all these conditions prevent obtaining uniform grade of the product.

This application forms a divisional part of my copending application, Serial No. 466,472, filed Dec. 8, 1908 for method for annealing flats and other shapes.

My invention is designed to provide means by which the flats or other sections may be subjected to a uniform heating and cooling action throughout, thereby insuring a uniform texture and hardness.

In accordance with my invention, the flats when rolled in a rolling mill are reeled up into close bundles. These bundles are after-

ward placed on an unreeling apparatus, such as indicated at 2, in Figs. 1 and 2, and the unreeled flats are led therefrom through an annealing furnace, such as shown at 3 on Figs. 1, 2, 3 and 4, or at 6 in Fig. 5. After passing out of the annealing furnace, the flats are gradually cooled without coming into contact with the outer air. For this purpose, they are first passed through protecting pipes or tubes 7, and then through a receptacle 8, containing layers of coke, coal or charcoal, which prevents oxidation by excluding air. Any other material which will form such a gas in contact with the metal, and which is in other respects non-injurious, may also be employed. The hot metal passing through this carbonaceous material, forms a non-oxidizing gas which protects the metal. The flats are then wound up on a suitable take-up frame 9, having reeling or coiling drums 10, upon which they are wound.

In the particular arrangement of apparatus shown in the drawings, provision is made for simultaneously annealing sixteen different flats, there being two sets of the unreeling rollers 2, arranged side by side and each set containing eight rollers in successively lower planes, as shown in Fig. 1. The take-up frame 9 is provided with a similar number of the coiling or take-up rollers 10.

The annealing furnace 3, shown in Figs. 1, 2, 3 and 4, consists of a furnace having a grate 18 and baffle walls 18^a, with a plurality of open end receptacles 19, extending longitudinally through the heating chamber one above the other and in two series. The ends of these receptacles are turned upwardly, as shown at 20, above the level of the lead bath contained therein, it being understood that there is one of these receptacles for each of the flats being annealed. In the modification shown in Fig. 5, the flats are passed downwardly through suitable guides 21; into a lead-containing receptacle, thence through the same and upwardly, and out through the guides 22. The receptacle is

heated by being placed over any suitable furnace.

The furnace shown and described is heated by coal or coke, but an equal result could be obtained by a furnace heated with gas, oil or any other manner known to the arts.

The advantages of my invention result from the uniform heating and cooling of the flats, whereby uniformity in the texture and hardness of the steel is obtained. Also from the simplicity of the apparatus which enables the process to be carried out continuously and with rapidity, it being possible to anneal a large number of flats or other sections simultaneously, thereby making possible a low manufacturing cost. It will be understood that any desired number of flats or other sections can be simultaneously annealed.

It will be noticed that the several wires, strips or flats, instead of, as is commonly the case, being run side by side in a horizontal plane, are placed one above the other in vertical planes. By this arrangement, the workmen have easy access to all the wires which would not be the case if many wires were placed horizontally.

I claim:—

1. In apparatus for annealing flats or other metal sections, an annealing furnace having a longitudinally extending series of lead containing receptacles, said receptacles having openings at their ends through which the articles to be annealed enter, means to cool the flats beyond the furnace, and means to surround the flats with a non-oxidizing atmosphere during their passage from the lead bath through the apparatus; substantially as described.

2. In apparatus for annealing flats or other metal sections, an annealing furnace having a longitudinally extending series of closed lead-containing receptacles therein, each of said receptacles having upwardly extending open ends provided with guides to receive the articles to be annealed, means to cool the flats beyond the furnace, and means to prevent the flats from contacting with the air during their passage from the lead bath through the cooling apparatus; substantially as described.

3. In apparatus for annealing flats or other metal sections, an annealing furnace having a longitudinally extending series of closed lead-containing receptacles therein, each of said receptacles having upwardly extending open ends provided with guides to receive the articles to be annealed, means to cool the flats beyond the furnace, and means to surround the flats with a non-oxidizing atmosphere during their passage through the apparatus, substantially as described.

4. In apparatus for annealing flats and

other metal sections, an annealing furnace containing a lead bath, means for guiding the articles to be annealed into and out of the bath, means to cool the flats beyond the furnace, and means to surround the flats with a non-oxidizing atmosphere during their passage through the apparatus beyond the lead bath; substantially as described.

5. Apparatus for annealing flats and other metal sections, comprising an annealing furnace containing a lead bath, means to cool the flats beyond the furnace, means to retain flats from contacting with the atmosphere during their passage from the lead bath through the cooling means, unreeling apparatus at one end of the furnace and reeling or take-up apparatus beyond the cooling means; substantially as described.

6. Apparatus for annealing flats and other metal sections comprising an annealing furnace containing a lead bath, unreeling apparatus at one end of the furnace, inclosed cooling means at the opposite end of the furnace, means to exclude the air from the flats while passing from the furnace to the cooling chamber, and a rereeling or take-up mechanism beyond the cooling means; substantially as described.

7. Apparatus for annealing flats and other metal sections comprising an annealing furnace containing a lead bath, unreeling apparatus at one end of the furnace, a re-reeling or take-up apparatus at the other end of the furnace, an inclosed cooling chamber intermediate the re-reeling or take-up and adjacent to the cooling chamber, closed guides for guiding the flats or other sections, and for excluding the air from the flats while passing from the furnace into the cooling chamber; substantially as described.

8. In apparatus for annealing flats or other metal sections, an annealing furnace having a longitudinally extending series of lead containing receptacles in a vertical plane, said receptacles having opening at their ends through which the articles to be annealed enter, means to cool the flats beyond the furnace, and means to surround the flats with a non-oxidizing atmosphere during their passage through the apparatus; substantially as described.

9. In apparatus for annealing flats or other metal sections, an annealing furnace having a longitudinally extending series of lead-containing receptacles in a vertical plane, each of said receptacles having upwardly extending ends provided with guides to receive the articles to be annealed, means to cool the flats beyond the furnace, and means to surround the flats with a non-oxidizing atmosphere during their passage through the apparatus; substantially as described.

10. In apparatus for annealing flats and

the like comprising an annealing furnace containing a lead bath and having a plurality of passages in a vertical plane for the flats, a plurality of un-reeling devices
5 at one end of the furnace, and a plurality of re-reeling devices at the other end of the furnace, means to cool the flats beyond the furnace, and means to surround the flats with a non-oxidizing atmosphere during their

passage through the apparatus; substantially as described. 10

In testimony whereof, I have hereunto set my hand.

FRED H. DANIELS.

Witnesses:

A. F. BACKLIN,
GEO. SIEURIN.