

E. H. & J. H. STEEDMAN.
 APPARATUS FOR TEMPERING METAL ARTICLES.
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1,027,010.

Patented May 21, 1912.

Fig. 1.

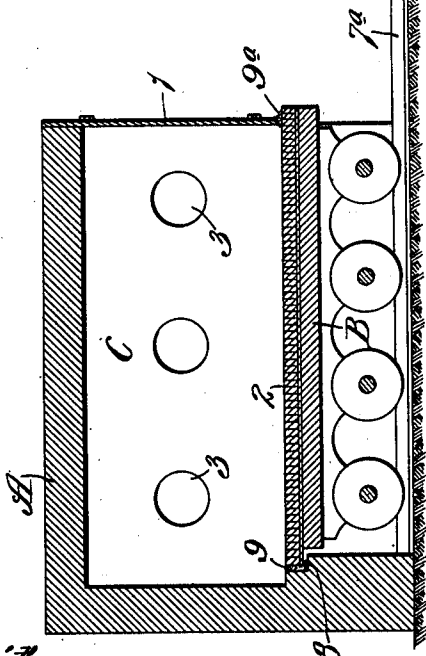
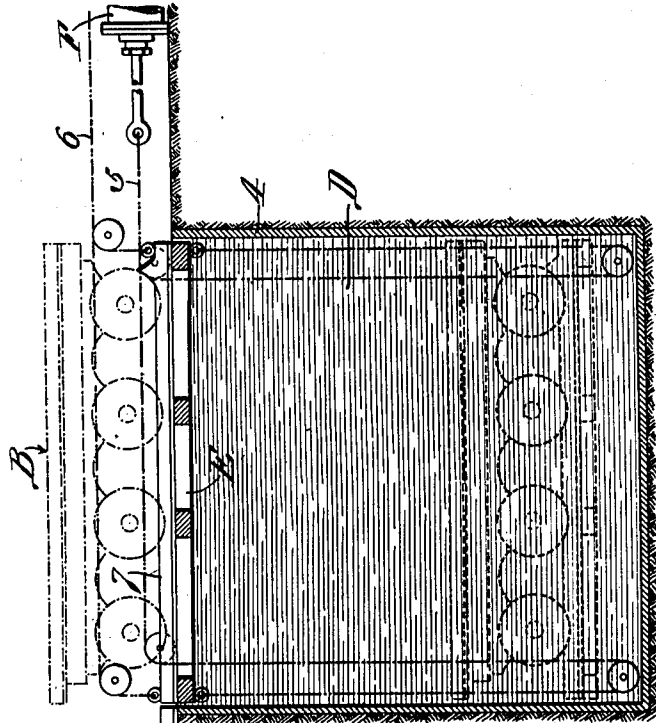
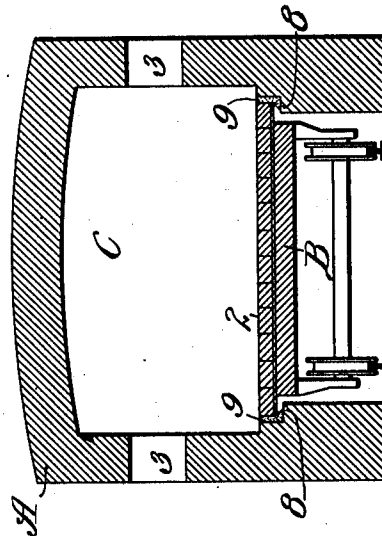


Fig. 2.



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR TEMPERING METAL ARTICLES.

1,027,010.

Specification of Letters Patent.

Patented May 21, 1912.

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To all whom it may concern:

Be it known that we, EDWIN H. STEEDMAN and JAMES H. STEEDMAN, both citizens of the United States, residing at St. Louis, Missouri, have invented a certain new and useful Improvement in Apparatus for Tempering Metal Articles, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to the manufacture of metal articles which have to be heated to a predetermined temperature and then quenched or submerged in a liquid bath so as to temper them.

One object of the invention is to provide an apparatus of novel construction which makes it possible to heat a large number of articles at one time and temper each article uniformly, thereby reducing the cost of manufacture and also insuring a more perfect product than could be obtained with the methods heretofore in general use. And another object is to provide an apparatus which overcomes the necessity of manually handling each article during the operation of transferring it from the furnace in which it is heated to the bath in which it is thereafter quenched.

Figure 1 of the drawings is a vertical longitudinal sectional view of an apparatus constructed in accordance with our invention; and Fig. 2 is a vertical cross sectional view of the heating furnace which forms part of said apparatus.

The apparatus herein shown which represents one form of our invention consists of a heating furnace A of any preferred type or design which is provided with an opening through which a car B can be moved into the furnace, said opening being normally closed by a door 1. The car B forms the bottom of the furnace chamber C and is therefore provided with a floor 2 of refractory material on which the articles being treated are placed. Any suitable means may be employed for heating the articles in the furnace chamber C, the furnace herein shown having openings 3 through which the heating medium is supplied to the furnace chamber. When the furnace is in operation the joints around the edges of the floor 2 of the car, and between the lower

edge of the door 1 of the furnace and the floor 2 of the car, are hermetically sealed by means which we will hereinafter describe.

After the articles being treated have been heated to a predetermined temperature in the furnace chamber C the car B with the articles thereon is withdrawn from said furnace chamber and immersed in a liquid bath D so as to quench the articles and thus temper them. In the apparatus herein shown the liquid in which the articles are quenched is contained in a tank 4 arranged in a lower horizontal plane than the furnace A, and an elevator E is arranged in said tank for receiving the car B after it has been withdrawn from the furnace chamber C. Said elevator may be of any preferred design or construction, and any suitable means may be employed for raising and lowering it such, for example, as a double-acting cylinder F provided with a piston which is connected by suitable cables 5 and 6 to the elevator so as to cause it to move downwardly when the piston moves in one direction and upwardly when the piston moves in the opposite direction, thereby immersing the car B with the articles thereon in the liquid bath D and subsequently withdrawing said car with the articles thereon from said bath. We wish it distinctly understood, however, that it is immaterial, so far as our broad idea is concerned, what particular means is used for immersing and withdrawing the member on which the articles are arranged after said member has been removed from the furnace in which the articles are heated. The tank 4 is preferably located in close proximity to the furnace A, and the elevator E is provided with a track 7 which alines with a track 7^a leading from the furnace, when the elevator is in its raised position, but it will, of course, be understood that the tank could be located in other positions, and that other means than a track could be employed for conveying the car from the furnace to the quenching bath.

The refractory floor 2 of the car B is preferably formed from fire-bricks, and the walls of the furnace A are provided with portions or ledges 8 which project slightly under the edge portions of the floor 2 of the car when the car is arranged in the furnace,

as shown in Figs. 1 and 2. By constructing the furnace in this manner, namely, providing the walls of same with ledges or portions 8 which project slightly under the edge portions of the floor of the car which constitutes the bottom of the furnace chamber, we are able to hermetically seal the joints at the edges of the floor 2 of the car by simply filling said joints with sand 9, as shown in Figs. 1 and 2. The sand flows downwardly onto the ledges 8 on the walls of the furnace and thus becomes packed firmly in the slot or space between the peripheral edges of the floor 2 of the car and the walls of the furnace. We also seal the joint between the lower edge of the door 1 of the furnace and the floor 2 of the car by means of sand 9^a, as shown in Fig. 1.

One advantage of an apparatus of the construction above described is that it enables metal articles to be tempered at a low cost owing to the fact that a large number of articles are heated at one time and thereafter quenched without handling the articles individually, it being possible with such an apparatus to treat at one time as many articles of assorted size as can be placed in the furnace. When articles or small pieces of metal are withdrawn individually from the heating furnace, or even when they are withdrawn in groups, the temperature of the furnace changes after the doors are opened and while the first article or batch of articles is being handled. Consequently, it was not practicable with the apparatuses heretofore in general use to treat a large number of articles or pieces of metal at one time, thereby making the cost of treating the articles very high on account of the fuel and labor expended.

Another advantage of our apparatus is that it enables articles to be tempered uniformly because the articles are maintained at a uniformly predetermined temperature while they are being transferred from the heating furnace to the bath in which they are quenched. That is to say, by taking the whole carload of articles out of the furnace at one time each article is kept at the desired temperature on account of the volume of heat in the mass of articles and consequently has no time to cool off before it is quenched. If the articles were removed one by one from the heating furnace, as in the apparatuses heretofore in general use, certain portions of same would be apt to cool off more quickly than other portions and consequently the article would not be tempered uniformly throughout its entire body. This unequal cooling is particularly apt to occur with long thin articles, it being very

difficult to remove such articles from the heating furnace and then submerge them in the quenching bath without having some portion of the article cool off slightly or drop below the required temperature. Our apparatus overcomes this objectionable feature and makes it possible to produce articles which are tempered uniformly because the heat which radiates from the large body of heated material on the floor of the car will hold even the thinnest article at the required temperature.

Having thus described our invention, what we claim as new and desire to secure by Letters Patent is:

1. An apparatus for treating metal articles, comprising a heating furnace, a car that is adapted to be moved horizontally into and out of said furnace so as to form the bottom of the furnace chamber, the car being provided with a refractory floor on which the articles rest while they are being heated and quenched, a tank containing a quenching bath, and means for enabling the car with the articles thereon to be immersed in said bath after the car has been withdrawn from the furnace.

2. An apparatus for treating metal articles, comprising a heating furnace provided in one of its side walls with a door, a car that is adapted to be moved horizontally into and out of the furnace, a refractory floor on said car for supporting the articles and which forms the bottom of the furnace chamber when the car is arranged in the furnace, a tank that contains a quenching bath, said tank and bath being separate and distinct from the furnace and having no effect on the operation of the furnace, and means for enabling the car with the articles thereon to be immersed in said bath after the car has been withdrawn from the furnace.

3. An apparatus for treating metal articles comprising a heating furnace, a tank located adjacent said furnace and containing a quenching bath, a track leading from said tank and extending into said furnace, a car on said track that forms the bottom of the chamber of said furnace and on which the articles are placed during the operation of heating them, and means for raising and lowering the car in said tank after it has been withdrawn from said furnace.

In testimony whereof, we hereunto affix our signatures, in the presence of two witnesses, this 28th day of July, 1911.

EDWIN H. STEEDMAN.
JAMES H. STEEDMAN.

Witnesses:

GEO. E. HOFFMANN,
R. E. WINKLER.