

July 3, 1928.

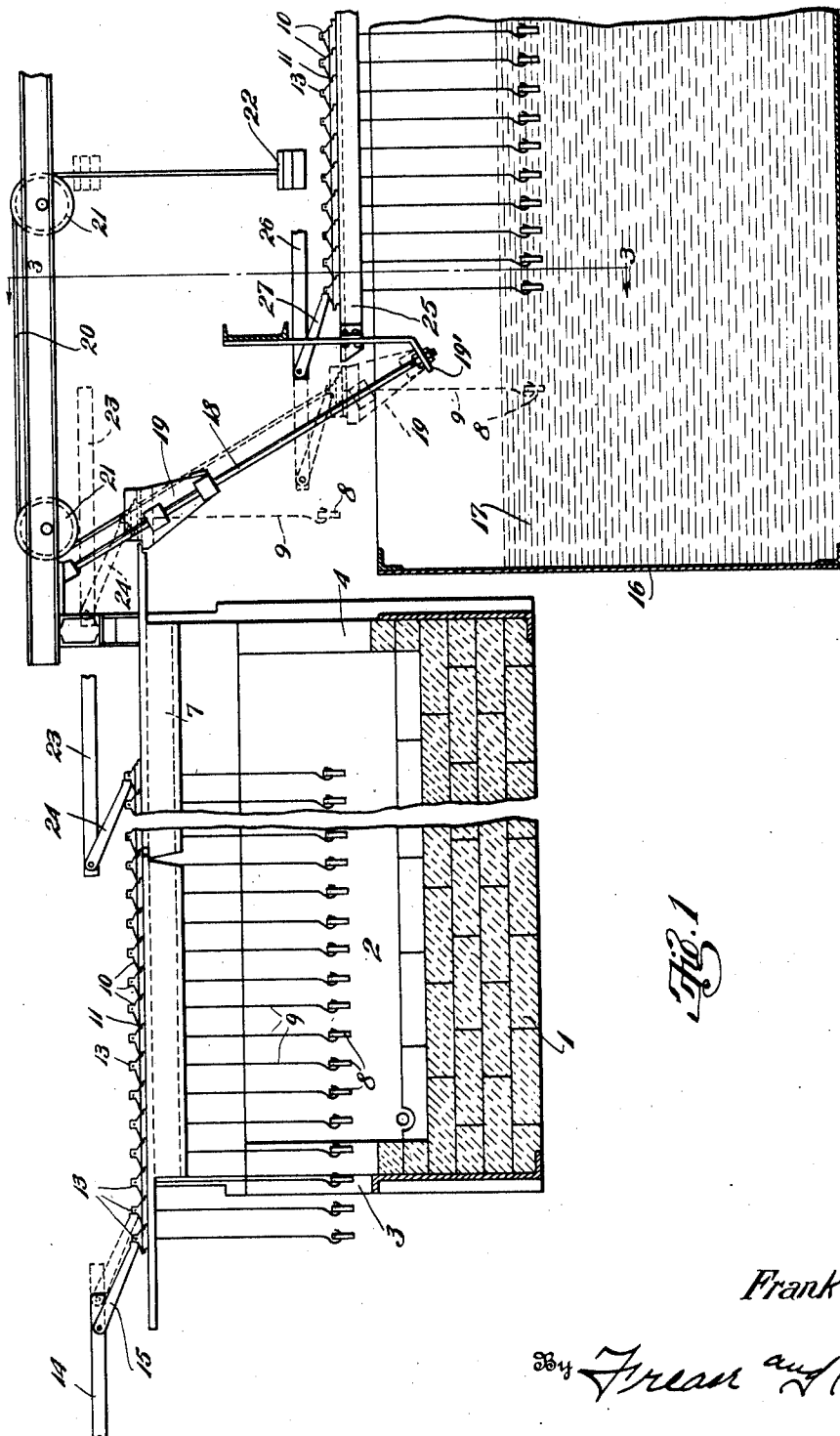
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F. T. COPE

DISCHARGING AND QUENCHING MECHANISM FOR FURNACES

Filed March 5, 1925

2 Sheets-Sheet 1



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Fig. 4

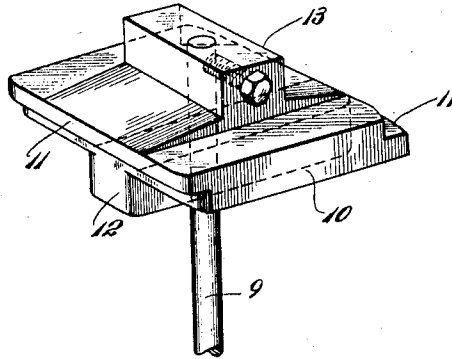


Fig. 2

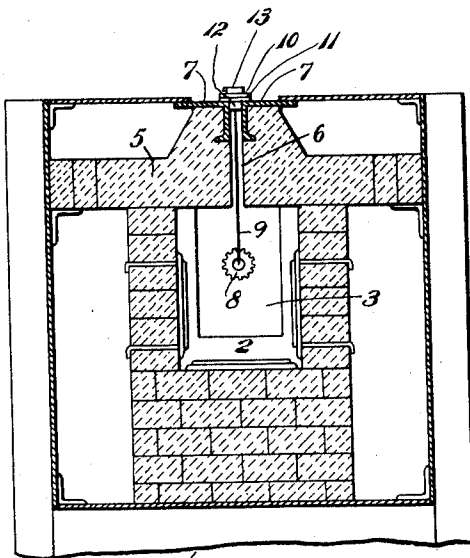
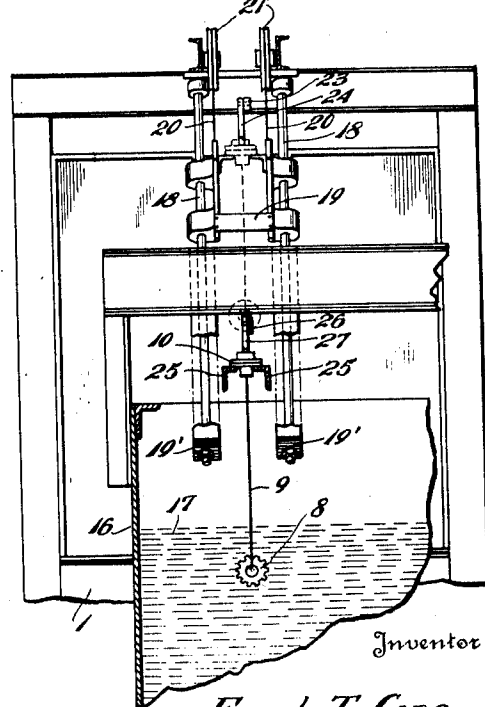


Fig. 3



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UNITED STATES PATENT OFFICE.

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DISCHARGING AND QUENCHING MECHANISM FOR FURNACES.

Application filed March 5, 1925. Serial No. 13,135.

This invention relates to continuous furnaces and more particularly to continuous furnaces such as are especially adapted for heat treating small articles such as automobile gears and the like and more particularly to means for discharging and quenching the material.

The objects of the improvement are to provide a continuous furnace through which the material to be treated is moved at a given rate of speed, means being provided for rapidly discharging the material from a point spaced from the discharge door and immediately delivering the material to a quenching bath in order that the material may be quenched when at the desired temperature and before it has been subjected to the cooling effect of the discharge door.

The above and other objects may be attained by constructing the furnace in the manner illustrated in the accompanying drawings, in which—

Figure 1 is a vertical longitudinal sectional view through a furnace embodying the invention;

Fig. 2, a transverse sectional view through the same;

Fig. 3, a section on the line 3—3, Fig. 1; and

Fig. 4, a detached perspective view of one of the movable blocks from which the articles are supported.

Similar numerals refer to similar parts throughout the drawings.

The furnace is indicated generally at 1 and may be of any length necessary to produce the desired heat treatment. The heating chamber 2 of the furnace may be heated electrically or by any other well known means and need only be of sufficient cross sectional area to accommodate the articles to be passed therethrough.

The entrance or charge opening 3 is provided at one end of the heating chamber, and a similar discharge opening 4 at the opposite end. Although doors may be provided for these openings and arranged to be automatically opened and closed to permit the entrance and exit of the articles under treatment, it is not thought necessary to illustrate the same, and for the purpose of this invention, it may be assumed that the doors are dispensed with.

The general construction of the furnace and the mechanism for moving the material

through the same, from the charging end, may be similar to that shown in my copending application Serial No. 751,024, in which the roof 5 of the furnace is provided with a central longitudinal slot 6 which may be reinforced as by the angle irons 7.

The articles to be heat treated, which in the present case are shown as automobile gears, indicated at 8, are arranged to be suspended upon the hooks 9 carried by the blocks 10, provided with the overlapping shoulders 11 at their ends, and having the depending ribs 12 arranged to slidably fit within the slot 6, a lug 13 being formed upon the upper side of each block.

In order to intermittently move the blocks forward along the slot 6, for the purpose of continuously moving the articles 8 through the furnace at a desired rate of speed, a reciprocating push rod 14 is provided and arranged to be continuously reciprocated by any well known means.

One or more pawls 15 is pivotally mounted on the rod 14 and inclined forward and downward to engage the lugs 13 of the sliding block, whereby with each reciprocation of the rod, the pawl 15 will ride backward and engage with the lug 13 of the rearmost block to carry all of the blocks forward with the necessary forward movement of the push rod.

A quenching tank 16 is shown at the discharge end of the furnace and beneath the level of the discharge opening 4, and oil or the like, as indicated at 17, is contained in said tank at a suitable level.

A pair of guide rods 18 are located beyond the discharge end of the furnace and inclined downward and rearward toward the tank and a transfer carriage 19 is slidably mounted thereon and normally held in raised position, as shown in Fig. 1, by means of the cable 20 which is passed over the pulleys 21 and carries the counterweight 22 which is just sufficient to overbalance the empty transfer carriage.

For the purpose of discharging the material rapidly from a point spaced from the discharge opening 4, a push rod 23 is arranged to be intermittently reciprocated, from the normal position shown in dotted lines in Fig. 1; to the position shown in full lines in said figure, the pawl 24 upon said push rod engaging the projection 13 to each block 10 as it reaches its point and rapidly

sliding said block out of the furnace and on to the transfer carriage 19.

The weight of the block and material 8 is sufficient to overbalance the counterweight 22, the transfer carriage sliding downward upon the guides 18, by gravity, until it contacts with the stop 19' at the lower end of the guide rods.

At this point the transfer carriage registers with a track 25 located above the quenching tank and the blocks carrying the material are removed from the carriage by means of the pusher rod 26 provided with the pawl 27, and moved forward along said track, the material being located beneath the oil level in the tank.

After the material has been properly quenched, the blocks carrying the same may be removed from the quenching tank by a mechanism similar to that which lowers the material into the tank, or by any other suitable device.

It will be understood that instead of the intermittent movement given to the blocks by the several reciprocating push rods, any well known mechanism may be provided for continuously moving the blocks, the invention residing in the quick discharging and quenching of the material after it reaches a point spaced from the discharge opening of the furnace, whereby the material is rapidly discharged and quenched while still at the desired temperature.

The advantages of this invention are ob-

vious, as it is well known that when steel is heated up to a certain temperature, the grain of the steel changes and becomes finer and if the steel is rapidly cooled at this point, the fine grain is retained, while if the steel is allowed to slowly cool, the grain again becomes coarse.

I claim:

1. A heat treating furnace including pusher means for moving material continuously through the furnace and independent pusher means for rapidly discharging and quenching the material as it reaches a point spaced from the discharge end of the furnace.

2. A heat treating furnace including pusher means for moving material continuously through the furnace, a quenching tank at the discharge end of the furnace, and independent pusher means for discharging the material and moving it into the tank more rapidly than it is moved through the furnace.

3. A furnace provided with a slot in its roof, blocks provided with article supporting rods depending through said slot, means for moving the blocks along the slot to a point spaced from the discharge end of the furnace, and means for moving the blocks more rapidly after reaching said point.

In testimony that I claim the above, I have hereunto subscribed my name.

FRANK T. COPE.