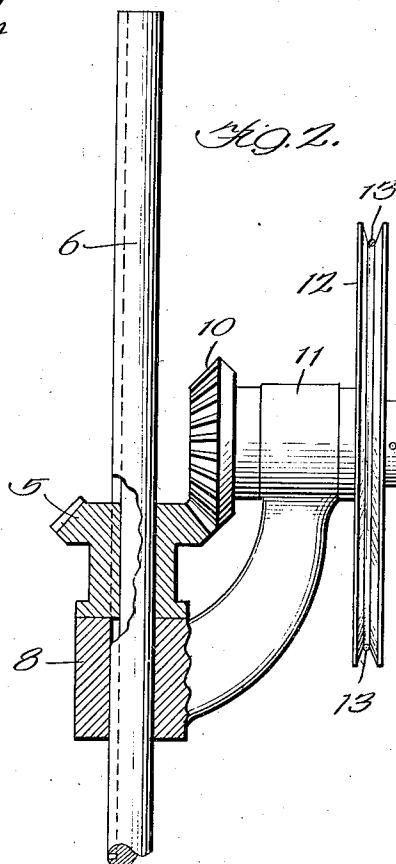
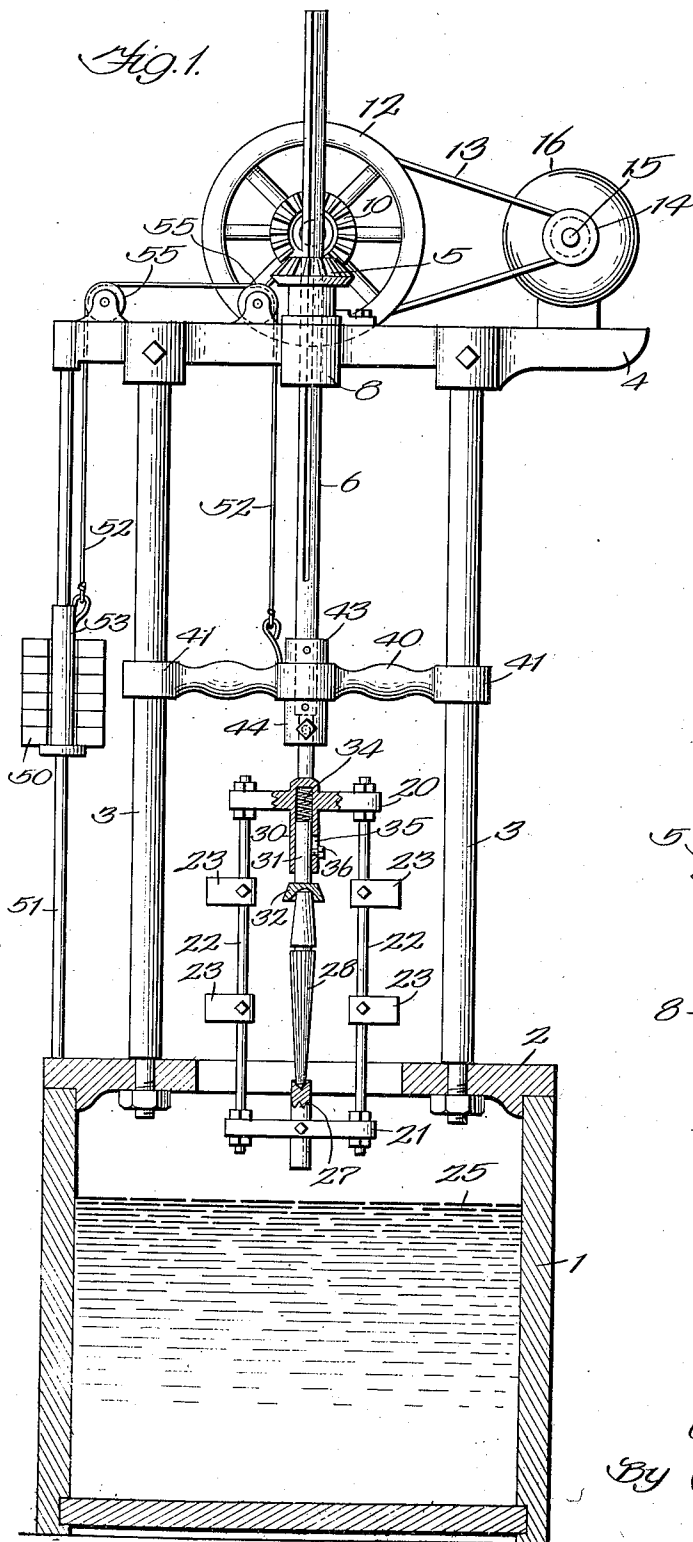


C. G. OLSON.
HARDENING MACHINE.
APPLICATION FILED JAN. 31, 1919.

1,335,912.

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Inventor:
Carl G. Olson.
By Cheever & Cox
Attys

UNITED STATES PATENT OFFICE.

CARL G. OLSON, OF CHICAGO, ILLINOIS, ASSIGNOR TO ILLINOIS TOOL WORKS, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

HARDENING-MACHINE.

1,335,912.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, CARL G. OLSON, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Hardening-Machines, of which the following is a specification.

My mechanism relates to tempering machines and is especially useful in the tempering of slender articles such as drills, reamers or shafts. Slender articles of this kind are apt to become warped in tempering and the object of my invention is to provide simple and convenient means whereby the article may be kept spinning about its longitudinal axis and be simultaneously lowered endwise into the bath.

In addition to the main object, it is my purpose to provide desirable contributory characteristics. For example, advantageous means for enabling the work to be quickly adjusted to and removed from the machine; also means for keeping the temperature of the bath substantially uniform throughout its bulk. These and similar details will become apparent from the following description taken in connection with the accompanying drawings, in which—

Figure 1 is a front elevation of the machine, showing the bath in vertical section,

Fig. 2 is a side elevation partly in section showing the spline connection between the work-holder shaft and the power device which drives it.

Like numerals denote like parts in both views.

In the particular form selected to illustrate the invention the bath consists of tank 1, having a cover 2, supporting a pair of standards, 3, 3. A platform 4 rests upon the upper end of the standards and carries a power device which, according to the design shown, includes a miter gear wheel 5, which is splined to the main shaft 6. Gear 5 rests upon a bracket 8, carried by the platform, and meshes with a miter gear 10, journaled in the arm 11 of said bracket.

Gear 10 is here shown to be driven by a sheave 12, connected by a belt 13 to a sheave 14, secured to the shaft 15 of an electric motor 16. Other means for driving the splined element 5 may however be substituted with similar effect.

Shaft 6 is arranged vertically and at its

lower end carries a work-holder, which in the illustration includes two cross bars 20, 21, rigidly held in fixed relation by a pair of side rods 22, 22. By preference these rods carry vanes 23, 23 which serve to agitate the cooling liquid 25 when the yoke is lowered into it, thus keeping the temperature of the liquid approximately uniform throughout.

The lower cross head 21 carries a vertically adjustable fixed center 27, which is preferably cupped at its upper end for receiving the lower end of the work 28. The upper cross bar 20 is here shown as being provided with a housing 30 which forms a guide for the stem 31 of the retainer 32, adapted to engage the upper end of the work. By preference part 32 is also cupped at the bottom to facilitate engagement with and disengagement from the work. The stem 31 is backed by a spring 34 which is inclosed within the housing and yieldingly holds the retainer 32 in engagement with the work. In order to prevent the stem 31 from leaving the housing a vertical slot 35 is formed in the side of the housing for a limited distance and a stop screw 36 passes in through the slot and screws into the side of the stem.

The position of the yoke vertically is controlled in the present design by means of a handle bar 40 which is arranged horizontally and has collars 41, 41 at its ends which encircle the standards 3 and are guided thereby in a vertical direction. In order to permit the shaft 6 to rotate in the non-rotatable handle bar, the latter is apertured to accommodate the shaft, and the collars 43 and 44 are secured to the shaft above and below the handle bar to hold the latter and the shaft relatively fixed, vertically.

The weight of the yoke and attached parts is counterbalanced by a weight 50 which is guided by a stationary upright guide rod 51. A cord 52 is attached at one end to the weight carrier 53 and at the other end to the handle bar 40. Said cord passes over suitable guide pulleys 55, 55 mounted upon the platform, 4.

In practice, when the operator is ready to temper a drill or other piece of work he grasps the hot piece in a pair of tongs and places the upper end of it in the cupped lower end of the retainer 32. He then presses upward until said retainer has arisen sufficiently to enable him to seat the lower

end of the work in the lower retainer 27. The upper retainer 32 follows the work down until the latter is seated whereupon the work will be securely held in place. The operator then starts the motor which causes the shaft 6 and the yoke attached thereto to rotate about the longitudinal axis of the work. It will be understood of course that articles of various shapes, not necessarily slender, may be tempered in this apparatus but slender articles are ordinarily the ones most apt to be distorted in the tempering and hence the article is herein referred to as being slender and positioned in the machine so as to rotate about its longitudinal axis.

After the work holder and work have started to spin they are lowered by the operator at any desired rate of speed. This is accomplished by grasping handle bar 40, and forcing the parts down until the work is immersed in the bath. As soon as the tempering has thus been accomplished the operator either forces the handle bar upward or permits it to move upward under the action of the counter weight 50. As soon as the work has risen high enough to be readily accessible, the operator stops the motor and removes the work preparatory to repeating the operation.

To remove the work it is only necessary to press upward upon it and force the upper retainer 32 upward sufficiently to permit the lower end of the work to clear the fixed retainer 27. The work is then swung sidewise and removed, the upper retainer 32 descending as far as permitted by the stop 36.

From the foregoing it will be seen that the chilling effect of the bath upon the work is uniformly distributed at all portions of the circumference of the work and hence there is no tendency for the work to become bent or distorted in any manner. The operation of chilling an article may be accomplished very rapidly as it is not necessary to manipulate any clamps or set screws in order to fasten the work in position in the machine. The work-retaining parts are practically self-acting and engage the work in such manner as to avoid any danger of the work becoming detached during the quenching operation.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. A tempering machine having a stationary frame, a bath, a work holder movable

vertically toward and from the bath, means for rotating the work holder about a vertical axis regardless of the vertical position of the work holder, and a nonrotatable handle guided by the frame and adapted to control the position of the work holder vertically.

2. A tempering machine having a stationary frame, a bath, a work holder movable vertically toward and from the bath, a vertical driving shaft adapted to rotate the work holder about a vertical axis and at the same time permit the work holder to move vertically, a handle connected to the work holder for moving it vertically said handle extending in two directions from the shaft, and means for preventing the rotation of said handle.

3. A tempering machine having a bath, standards rising therefrom, a platform supported by said standards, a power device on the platform, a vertically movable workholder rotatable about a vertical axis, driving connections between the work power device and the workholder for driving the latter, and a handle bar guided by said standards for controlling the position of the workholder, vertically.

4. Tempering apparatus having a bath, a rotatable workholder movable toward and from the bath, and stirrers on the workholder for keeping the bath liquid at practically uniform temperature throughout.

5. Tempering apparatus having a bath, a yoke movable vertically toward and from the bath, means for rotating the yoke about a vertical axis regardless of the vertical position of the yoke, a work retainer mounted in the yoke for engaging one end of the work, a second work retainer mounted in the yoke and movable toward and from the first retainer for engaging the opposite end of the work, a spring for backing up one of said retainers and a housing for said spring, said housing also forming a guide for the second retainer.

6. A tempering machine, having a bath, a yoke movable toward and from the bath, means for rotating the work about a movable axis, and two cooperating members carried by the yoke and adapted to engage the work between them, one of said cooperating members being cupped, for the purposes described.

In witness whereof, I have hereunto subscribed my name:

CARL G. OLSON.