Jan. 26, 1943. J. M. LUERS 2,309,518

QUENCHING AND STRAIGHTENING TOOL

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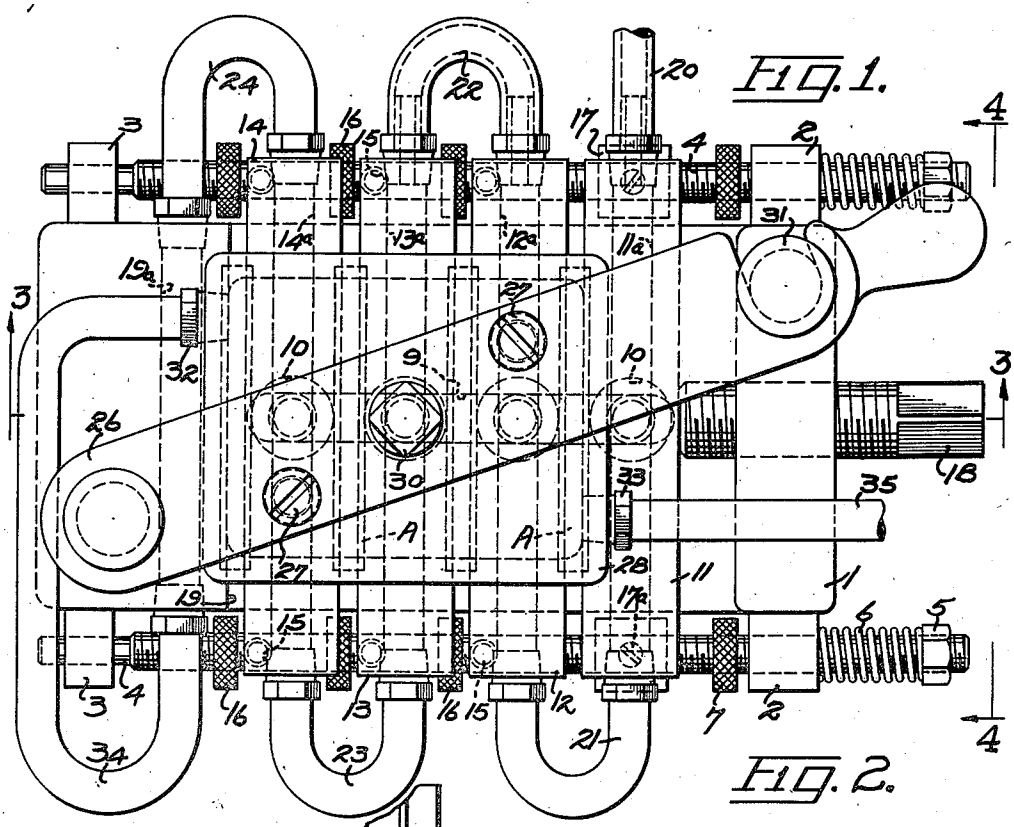


FIG. 1.

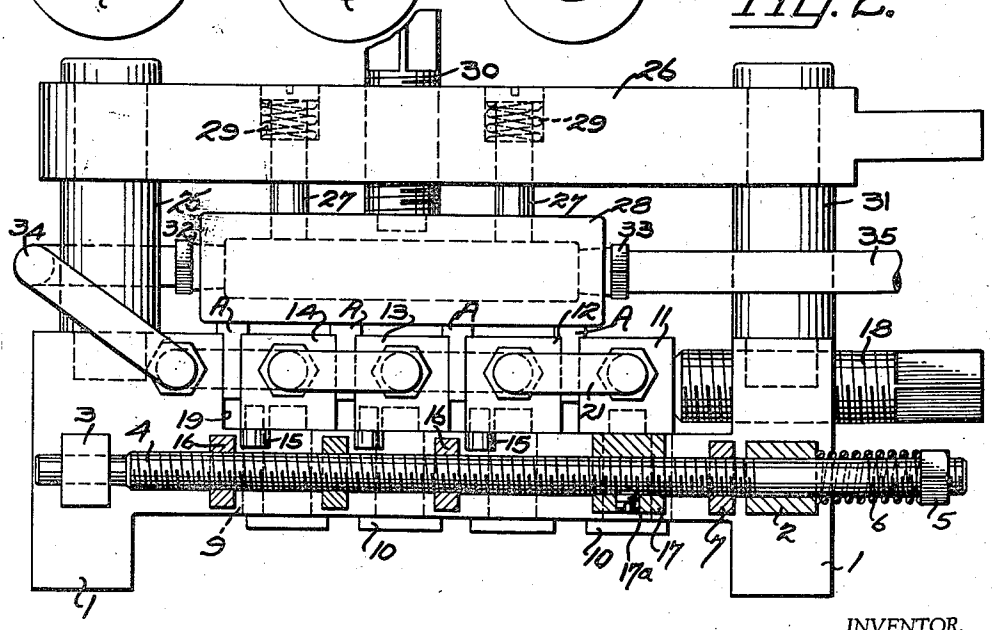


FIG. 2.

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FIG. 3.

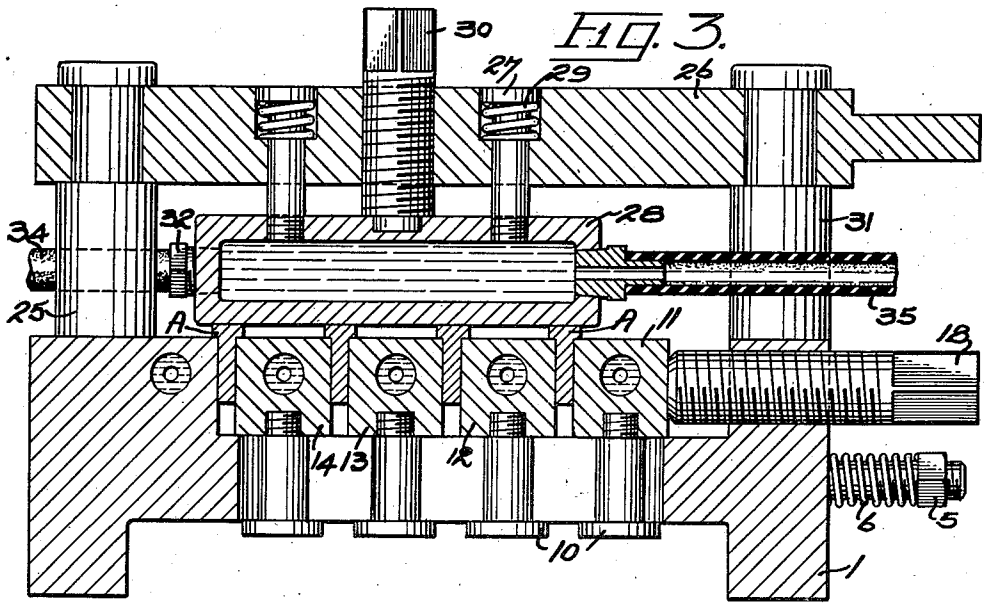
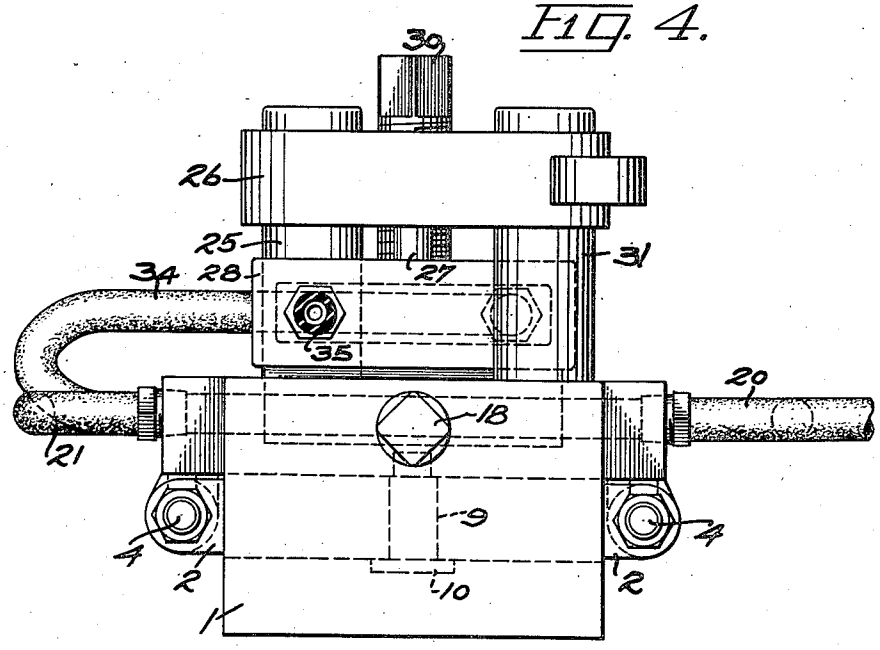


FIG. 4.



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QUENCHING AND STRAIGHTENING TOOLS

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11 Claims. (Cl. 266—2)

This invention relates to a quenching and straightening tool. Various work pieces which require hardening or tampering, particularly blades and cutters of various types, are made in large quantities and as they cool these tools are liable to become warped or deformed so that they are no longer suitable for the purpose intended.

It is an object of this invention to provide a quenching and straightening tool in which a plurality of work pieces may be placed simultaneously when hot in order to prevent the occurrence of the deformation above referred to, and also to obtain a uniform quenching and therefore a uniform temper in all the work pieces.

This invention also aims, among other things, to provide a quenching and straightening tool; wherein means are provided for adjusting the spacing between the blocks between which the work pieces are held so that the tool may be set to receive work pieces of different widths; wherein a movable upper plate is provided which is vertically adjustable and can be easily set to bear against the upper surfaces of the work pieces to prevent any vertical distortion while they are cooling; and wherein the blocks and upper plate are water cooled for quenching the workpieces.

Having thus briefly and broadly stated some of the objects and advantages of the invention, I will now describe a preferred embodiment thereof with the aid of the accompanying drawings, wherein:

Figure 1 illustrates a plan view of the invention.

Figure 2 is a front view thereof.

Figure 3 is a section on the line 3—3 of Figure 1, and

Figure 4 is an end view taken on the line 4—4 of Figure 1.

Referring to the drawings, 1 designates a base on opposite sides of which bearings 2 and 3 are arranged in pairs. Mounted for both rotary and axial movement in each pair of bearings 2 and 3 is a rod 4 which is threaded intermediately of its length. Provided around each rod 4 between its bearing 2 and an enlargement, such as a nut 5, on its adjacent extremity is a helical spring 6. These springs tend to move the rods 4 axially to the right—Figures 1 and 2— and in threaded engagement with these rods are stops 7 which contact the opposite sides of the bearings 2 and limit the rod movement.

Formed substantially centrally across the base 1 parallel with the rods 4 is a slot 9 upwardly through which guides 10 extend. Each of these guides is secured into the underside of a block 11, 12, 13 or 14, all of which latter are mounted upon the base 1 for movement parallel with the rods 4. Projecting downwardly from opposite ends of the blocks 12, 13 and 14 adjacent the rods 4 are contact members 15 which are contacted by adjustable elements 16 in engagement with threaded portions of the said rods, so that when the latter are moved axially by the springs 6 the elements 16 strike the members 15 and move the blocks 12, 13 and 14 to the right, Figures 1 and 2. On opposite extremities of the block 11 apertured lugs 17 are secured through which the rods 4 pass, and screws 17*a*, or other suitable fastening means hold these lugs to the rods so that upon axial movement of the latter the block 11 is correspondingly moved.

In threaded engagement with one side of the base 1 substantially centrally of its length is an adjusting screw 18 extending parallel with the rods 4. This screw contacts the adjacent side of the block 11 and when tightened forces the latter to the left—Figures 1 and 2—across the base 1 thereby also moving the rods 4 axially against the tension of the springs 6. A denotes work pieces one of which is held between the blocks 11 and 12, another between the blocks 12 and 13, another between the blocks 13 and 14, and another between the block 14 and an opposed bearing member or face 19 provided upon the base 1. As the blocks are moved to the left by adjustment of the screw 18 the workpieces are securely gripped and as the block 11 is moved the elements 16 are moved away from the contact members 15 into their relative positions shown. Obviously when the screw 18 is slackened back the springs 6 move the rods 4 and block 11, and the elements 16 contact the members 15 and move the blocks 12, 13 and 14 in the same direction until the spacings between the blocks, and between the block 14 and the bearing face 19 is sufficient to permit the removal of one set of workpieces and the insertion of another set. The movement of the rods 4 to the right is then halted by the stops 7.

The blocks 11, 12, 13 and 14 and that portion of the base adjacent the bearing face 19 are provided with cooling passages 11*a*, 12*a* 13*a*, 14*a* and 19*a* respectively through which a cooling medium may flow. In order that the flow may be continuous through these passages a tubular connection 20 is attached to one extremity of the passage 11*a* from the opposite extremity of

which the medium passes to the block 12 through a connection 21. Another connection 22 connects the passage 12a with the passage 13a, and from the block 13 the flow is continued through a connection 23 to the passage 14a whence it passes into the passage 19a through a connection 24.

Extending upwardly from the base 1 is a fulcrum pin 25 having an arm 26 pivoted thereon. Supported beneath the arm 26 by guide pins 27 which depend therefrom is a hollow upper plate 28 which is urged in an upward direction by springs 29 mounted upon the said pins. In threaded engagement with the arm 26 and extending downward therethrough is a screw 30 which, when tightened, forces the plate 28 down against the top of the work pieces A and prevents vertical distortion of the pieces while they are cooling. Obviously when the screw 30 is turned in one direction the plate 28 is raised by the springs 29. 31 denotes a stop to limit the pivotal movement of the arm 26 and halt its movement when it is correctly positioned over the workpieces.

A suitable inlet and outlet 32 and 33 is provided in the upper plate 28, which is hollow, so that the cooling medium may also pass therethrough. In the present instance a connection 34 extends from one extremity of the passage 19a in the base 1 to the plate inlet 32, and from the outlet 33 another tubular connection 35 extends.

From the foregoing it will be readily seen that the adjustable elements 16 and the stops 7 may be set so that work pieces of different widths can be supported for straightening and quenching, and at the same time the upper faces of the workpieces are held against distortion by the plate 28 which is vertically adjustable and through which the cooling medium also flows.

While in the foregoing the preferred embodiment of the invention is described and shown, it is understood that alterations and modifications may be made thereto provided they fall within the scope of the appended claims.

What I claim is:

1. A tool of the character described comprising a base, means thereon for straightening work pieces therebetween, a post extending from the base, an arm pivoted thereon, an upper plate mounted beneath the arm, means coacting with the arm for adjusting the plate downward to bear upon the upper sides of the work pieces to support them against distortion, and means for arresting the pivotal movement of the arm when the upper plate is in correct operative position.

2. An arrangement of the character described comprising a base having a bearing face thereon, a plurality of blocks parallel with one another and with said bearing face, said blocks being mounted for movement toward and from said bearing face to engage work pieces between adjacent pairs of blocks and between the bearing face and the block adjacent thereto so that two work pieces are engaged by each intermediately positioned block one by each side thereof, means for moving the block farthest from the bearing face toward the latter to sucessively engage said work pieces, and spring actuated means for moving all said blocks away from the bearing face and for increasing the spacing between adjacent blocks when the plate moving means is released.

3. An arrangement of the character described comprising the combination set forth in claim 2, including a plate mounted for movement at right angles to the direction of movement of the blocks adapted to bear against the edge faces of work pieces supported between adjacent pairs of blocks.

4. An arrangement of the character described comprising a base having a vertical bearing face thereon, a plurality of substantially parallel blocks mounted for independent movement towards and from the bearing face and substantially parallel therewith to engage work pieces between adjacent pairs of blocks and between the bearing face and the adjacent block, means for forcing the blocks towards one another to engage said work pieces, and spring actuated means tending to move all the blocks away from the bearing face and to increase the spacing between said blocks.

5. An arrangement of the character described comprising the combination set forth in claim 4, wherein the blocks and the bearing face are water cooled, and including a water cooled plate mounted over the base for movement at right angles to the direction of movement of the blocks to bear against the edge faces of the work pieces between said blocks.

6. An arrangement of the character described comprising a base having a bearing face thereon, a row of substantially parallel blocks mounted for reciprocation on the base towards and from said bearing face and substantially parallel therewith to engage work pieces between adjacent pairs of blocks and between the bearing face and the block adjacent thereto, parallel rods mounted for axial movement on said base, spring means tending to move the rods in one direction, coacting means on the rods and blocks whereby movement of the rods by spring action increases the spacing of the blocks from one another and from the bearing face, and means for moving the blocks toward the bearing face to engage the work pieces.

7. An arrangement of the character described comprising the combination set forth in claim 6, including a plate mounted for movement at right angles to the direction of movement of the blocks adapted to bear against the faces of the work pieces between adjacent blocks.

8. An arrangement of the character described comprising the combination set forth in claim 6, wherein the blocks are mounted for independent reciprocation, and wherein the means for moving the blocks is directly applied to the block farthest from the bearing face.

9. An arrangement of the character described comprising a base having a bearing face thereon, a row of blocks substantially parallel to one another and to said bearing face mounted on the base for reciprocation towards and from said bearing face to engage work pieces between adjacent pairs of blocks and between one block and the bearing face, coacting means on each block and base for controlling the path of movement of the blocks, said bearing face and said blocks being water cooled, rods mounted on the base for axial movement parallel to the path of movement of the blocks, coacting means on the rods and blocks for moving the latter away from the bearing face to permit insertion of said work pieces, spring means tending to move the rods in that direction, and means for moving the block remote from the bearing face towards the latter whereby the work pieces are successively engaged.

10. An arrangement of the character described comprising a base having a vertical bearing face towards one extremity, a plurality of substantially parallel blocks mounted for independent

horizontal movement towards and away from the bearing face, the latter being substantially parallel to said blocks whereby work pieces may be engaged between adjacent pairs of blocks and between the bearing face and the block adjacent thereto, rods mounted on the base for axial movement parallel to the path of movement of the blocks, means connecting the block farthest from the bearing face with the rods for movement therewith, coacting means on the rods and the other blocks for moving the latter away from the bearing face when the rods are moved in one direction, springs tending to move the rods whereby the blocks are moved farther from the bearing face, and means on the base for moving the block farthest from the bearing face towards the latter.

11. An arrangement comprising the combination set forth in claim 10, wherein the bearing face and blocks are water cooled, and a plate mounted for movement at right angles to the direction of movement of the blocks to bear against the edge faces of work pieces held between the blocks.

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