May 24, 1955 J. E. ALLEN 2,709,077

DEVICE FOR PREVENTION OF TOOL DEFORMATION DURING HARDENING

Filed April 26, 1954

Fig. 1

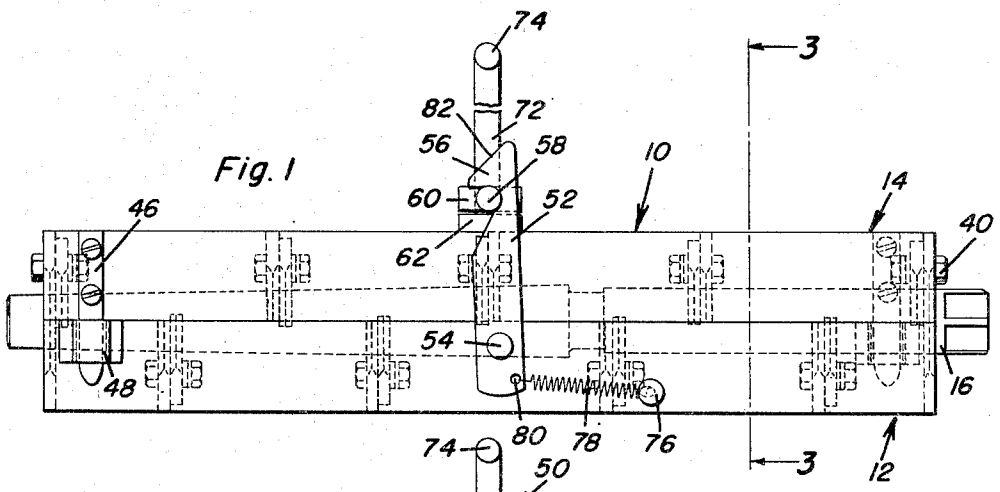


Fig. 2

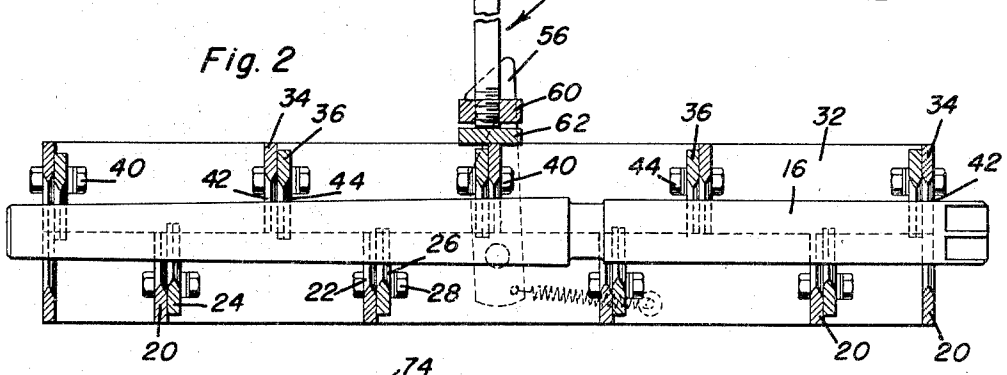


Fig. 3

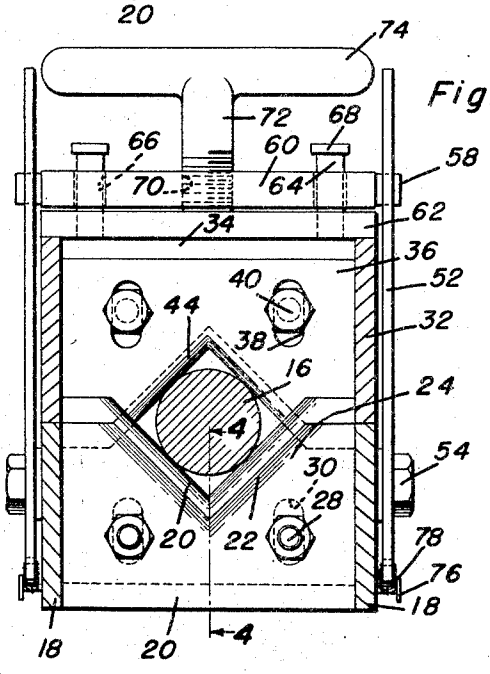
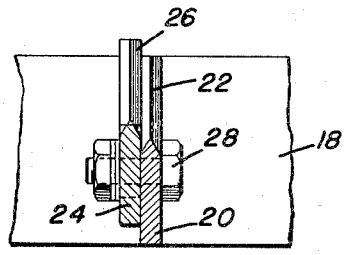


Fig. 4



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DEVICE FOR PREVENTION OF TOOL DEFORMATION DURING HARDENING

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4 Claims. (Cl. 266—6)

This invention relates to a device for the prevention of tool deformation during the hardening process and more specifically is in the nature of a jig for holding a tool during the hardening process thereby preventing warping or misalignment of the tool.

An object of this invention is to provide an improved device for holding tools during the hardening process thereby preventing the deformation thereof which is simple in construction, easy to apply, time saving, adjustable in size, well adapted for its intended purposes and relatively inexpensive to manufacture.

In the old method of straightening tools, it was required to place the tool into a V-shaped block and placing pressure on the uneven spots thereby straightening the tool. In conjunction with this, a lathe or other device was used to determine the uneven spots and after several trial and error operations, the hardening process was finished. Therefore, it is another object of this invention to provide a device for quickly clamping a tool before the tool is inserted in the cooling liquid thereby retaining the tool in a straight condition while cooling and hardening.

A further object of this invention is to provide a jig for holding tools during the hardening process wherein the jig will clamp and engage the tool at a plurality of longitudinally spaced points thereby preventing the usual warping and misalignment of the tool that occurs during the quenching thereof when the tool is inserted in the cooling liquid such as water, oil or some brine solution.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

Figure 1 is a side elevational view of the device of the present invention showing the means for retaining the device in assembled position for holding a tool in alignment;

Figure 2 is a longitudinal vertical section taken substantially along a plane through the longitudinal center line of the construction of Figure 1;

Figure 3 is a transverse, vertical section taken substantially along section line 3—3 of Figure 1 showing the details of construction of the tool rests, the upper tool engaging members and a means for retaining the cap member on the base member; and

Figure 4 is a detail section taken substantially along section line 4—4 of Figure 3.

Referring now specifically to the drawings, it will be seen that the numeral 10 generally indicates the device for the prevention of tool deformation during the hardening process of the present invention. The device generally includes a base member as indicated by the numeral 12 and a cap member as indicated by the numeral 14 which are normally in overlying relation for positioning and retaining an elongated tool 16 therebetween for holding the tool in straight or aligned condition during the quenching and hardening process.

Referring now specifically to Figures 2 and 3, it will be seen that the base 12 generally includes a pair of vertically disposed elongated side members 18 having a plurality of transverse members 20 extending between the side members 18 and rigidly secured thereto thereby rigidly spacing the side members 18 in parallel relation. The upper ends of the transverse members 20 are each provided with a V-shaped notch 22 which is provided with an upper sharpened or knife edge. As seen in Figure 2, the transverse members 20 that are spaced from the ends of the base 12 are each provided with a V-shaped tool rest 24 which is also provided with a V-shaped notch 26 in the upper edge thereof and the notch 26 is also provided with a sharpened edge for engaging the tool 16 at spaced points of contact thereby permitting circulation of fluid around substantially the entire circumference of the tool 16 for a purpose described hereinafter.

The tool rests 24 are secured to the transverse members 20 by a fastening bolt 28 adjacent each side member 18 and the tool rests 24 are provided with a pair of slots 30 for slidably receiving the fastening bolts 28 thereby permitting vertical adjustment of the tool rests 24 in relation to the transverse members 20. Obviously, the tool rests 24 may be clamped into adjusted position by manipulating the fastening bolts 28 in an obvious manner. It will be understood that by adjusting the various tool rests 24, tools of various sizes and shapes may be accommodated by the device of the present invention.

Referring now specifically to the upper half of the device 10, it will be seen that a cap 14 includes a pair of side members 32 having a plurality of transverse spacer members 34 longitudinally spaced between the side members 32 and rigidly positioning the side members 32 in parallel relation. Each of the transverse members 34 is provided with a vertically adjustable tool engaging member 36 having a pair of slots 38 for receiving the shanks of fastening bolts 40 thereby permitting vertical adjustment of the tool engaging members 36 in relation to the transverse members 34. The upper transverse members 24 are provided with knife edged V-shaped notches 42 and the tool engaging members 36 are also provided with V-shaped knife edged notches 44 which are inverted and positioned over the tool 16 for engaging the tool at spaced points of contact similar to the tool rests 24. As shown in Figure 2, the tool rest members 24 and the tool engaging members 36 are staggered in relation to each other and the tool engaging members 36 are positioned at each end of the cap 14 and at spaced points therebetween in staggered relation to the tool rests 24 on the base 12.

Referring now specifically to Figure 1, it will be seen that the cap 14 is provided with a depending member 46 which is slidably received in a loop member 48 secured on the base 12 thereby providing a guide for relative movement between the base 12 and cap 14. It will be seen that the guide loop 48 and the depending member 46 slidable therein are positioned at opposite corners for retaining the cap 14 and base 12 in overlying alignment.

It will be seen that the numeral 50 generally indicates the means for retaining the cap 14 and the base 12 in overlying relation with a small amount of pressure on the tool 16. A pair of hook shaped members 52 are pivotally secured to the side members 18 of the base 12 by suitable pivot pins 54 and the upper ends of the hook members 52 are provided with bill portions 56 for engaging over projecting pins 58 on a transverse

bar 60. The transverse bar 60 extends across the upper portion of the cap 14 in spaced relation thereto and the pins 58 project outwardly beyond the edges of the side members 32 of the cap 14 for engagement by the bill portions 56 of the hook members 52. A cross member 62 extends in overlying position centrally of the side members 32 of the cap 14 and is rigidly secured thereto on the upper surface thereof. A pair of upstanding pins 64 are rigidly secured to the cross member 62 and are positioned in a pair of apertures 66 in the transverse bar 60 and have enlarged headed ends 68 for limiting the vertical movement of the transverse bar 60 in relation to the cross member 62. The transverse bar 60 is provided with an internally threaded central aperture 70 and a screw threaded member 72 having a T-shaped handle 74 is inserted in the screw threaded aperture 70 in the bar 60 for abutment against the upper surface of the cross member 62 thereby exerting pressure on the cross member 62 and the cap 14 upon rotation of the T-shaped handle 74. A pair of projecting pins 76 are provided on the side members 18 of the base 12 in spaced relation to the lower end of the hook members 52 and a tension coil spring 78 is positioned between each of the pins 76 and an aperture 80 in the lower end of the hook members 52. The upper end of the bill portion of the hook members 52 is provided with a cam surface 82 wherein the projecting pins 58 will engage the cam surface 82 thereby urging the hook members 52 about the pivot pins 54 against the tension of the spring 78 wherein the projecting pins will automatically be positioned under the hooked bill portion 56 of the hook members 52 when the cap 14 is moved vertically onto the base 12 with the depending member 46 in the guide loop 48.

In operation, the tool 16 is positioned on the tool rests 24 in the base 12 and the tool rests 24 adjusted in order to engage the tool 16 in proper position. The cap 14 is positioned on the base 12 by vertical movement with the depending guide lugs 46 inserted in the loops 48 thereby engaging the projecting pins 58 with the cam surfaces 82 thereby pivoting the hook members 52 about the pivot pins 54 against the tension of the spring 78 thereby bringing the hook bill 56 over and above the projecting pins 58. Assuming that the tool engaging members 36 have been correctly adjusted, the handle 74 then may be given one turn downwardly thereby placing a small amount of pressure along the longitudinal length of the tool 16 at various staggered points. Due to the V-shaped notch in the tool engaging members and the tool rests, it will be seen that the quenching fluid or cooling fluid will circulate completely around the circumference of the tool 16 thereby giving an even cooling effect and it will be seen that this device 10 may be easily and quickly adjusted and positioned on successive tools for maintaining the tool straight during the hardening process.

From the foregoing, the construction and operation of the device will be readily understood and further explanation is believed to be unnecessary. However, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the appended claims.

What is claimed as new is as follows:

1. A device of the class described comprising an elongated base, a plurality of longitudinally spaced tool rests on said base, an elongated cap in overlying relation to said base, a plurality of spaced tool engaging members on said cap, and means interconnecting said base and cap for retaining the tool rests and tool engaging members in contact with a tool positioned therebetween for keeping the tool straight during the hardening process, said interconnecting means including a transverse bar positioned centrally above the upper side of the cap, a pin projecting from each end of said transverse bar, a pair of hook members having shank portions pivotally mounted on said base and bill portions engaging said pins, and a screw threaded member extending through said bar and abutting said cap for urging the cap towards the base.

2. The structure as defined in claim 1 wherein said base and cap are provided with interengaging guide means for retaining the base and cap in alignment.

3. The structure as defined in claim 2 wherein said cap is provided with a cross member beneath the transverse bar and engaging the central upper surface of the cap, guide and retaining means extending between the cross member and the transverse bar, said screw threaded member abutting said cross member and provided with T-shaped manipulating handle.

4. A device of the class described comprising an elongated base, a plurality of longitudinally spaced tool rests on said base, an elongated cap in overlying relation to said base, a plurality of spaced tool engaging members on said cap, and means interconnecting said base and cap for retaining the tool rests and tool engaging members in contact with a tool positioned therebetween for keeping the tool straight during the hardening process, said interconnecting means including a transverse bar positioned centrally above the upper side of the cap, a pin projecting from each end of said transverse bar, a pair of hook members having shank portions pivotally mounted on said base and bill portions engaging said pins, and a screw threaded member extending through said bar and abutting said cap for urging the cap towards the base, said base and cap are provided with interengaging guide means for retaining the base and cap in alignment, said cap being provided with a cross member beneath the transverse bar and engaging the central upper surface of the cap, guide and retaining means extending between the cross member and the transverse bar, said screw threaded member abutting said cross member and being provided with a T-shaped manipulating handle, said hook members being biased against a stop member for retaining the hook members in vertical position, said hooks having upper cam surfaces for engagement by said pins upon vertical assembly of said base and cap.

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