(No Model.)

J. G. FOLSOM.

METAL HARDENING DEVICE.

No. 385,347. Patented July 3, 1888.

Fig. 1.

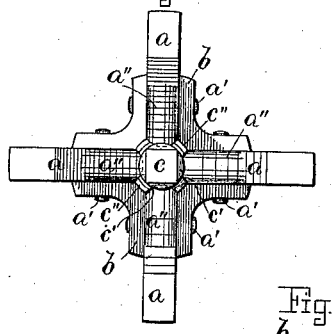


Fig. 3.

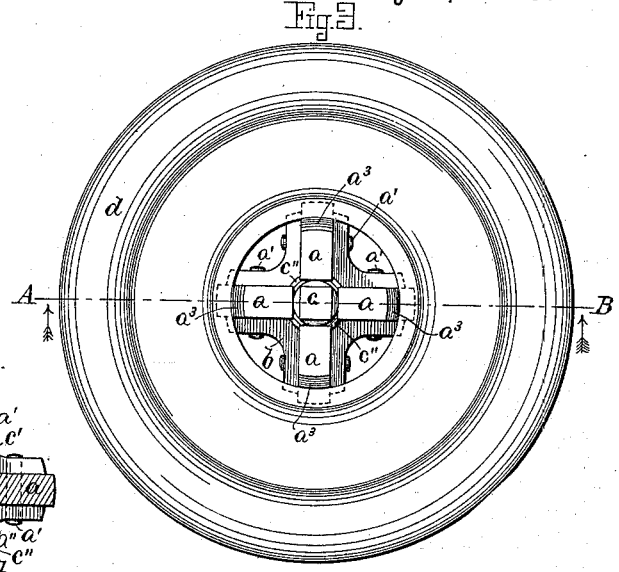


Fig. 5.

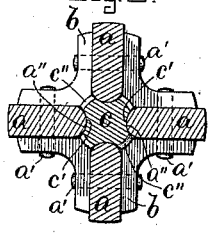


Fig. 2.

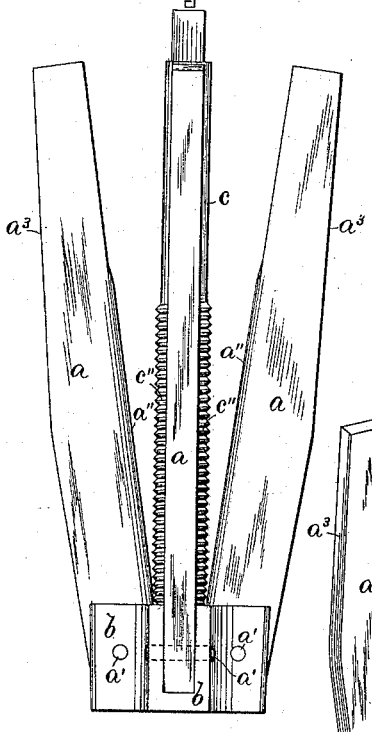


Fig. 4.

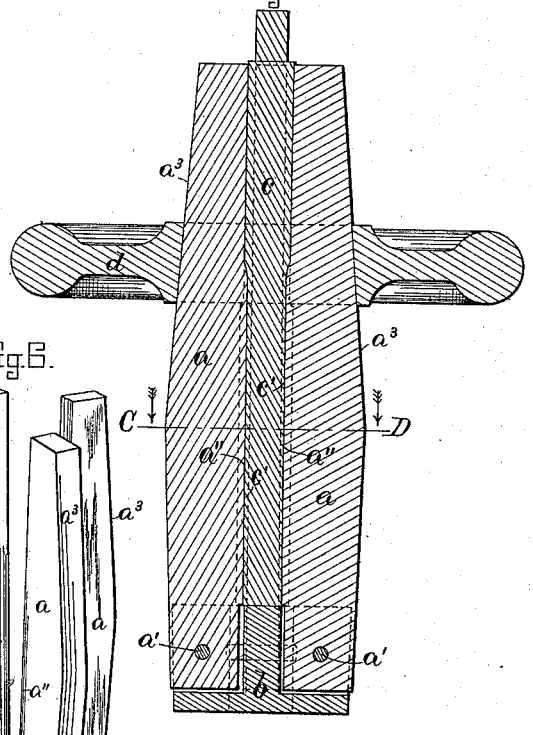
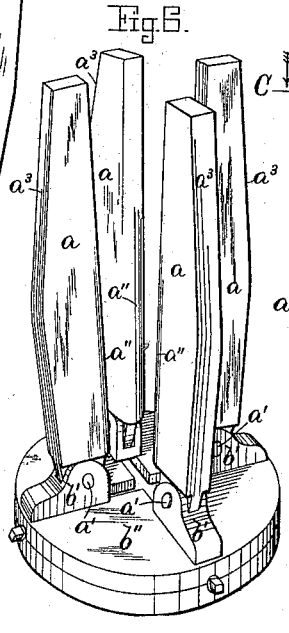


Fig. 6.



Witnesses.

Henry Chadbourn.

H. L. Chapin.

Inventor.

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by Albert G. Andrew.

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UNITED STATES PATENT OFFICE.

JOHN G. FOLSOM, OF WINCHENDON, MASSACHUSETTS.

METAL-HARDENING DEVICE.

SPECIFICATION forming part of Letters Patent No. 385,347, dated July 3, 1888.

Application filed December 23, 1887. Serial No. 258,799. (No model.)

To all whom it may concern:

Be it known that I, JOHN G. FOLSOM, a citizen of the United States, and a resident of Winchendon, in the county of Worcester and State of Massachusetts, have invented new and useful Improvements in Metal-Hardening Devices, of which the following, taken in connection with the accompanying drawings, is a specification.

This invention relates to an improved device for hardening articles of metal—such as, for instance, screw-taps, mandrels, flat and twist drills, &c.; and it has for its object to prevent the warping or contracting, or both, of the articles while in the act of being hardened, as well as to straighten them, if crooked, during the heating process, as will hereinafter be more fully shown and described, reference being had to the accompanying drawings, where—

Figure 1 represents a plan view of the device, showing the jaws or clamping-levers expanded and a tap placed in position. Fig. 2 represents a side elevation of the same. Fig. 3 represents a plan view of the device, showing the tap as clamped in position between the jaws. Fig. 4 represents a central longitudinal section on the line A B, shown in Fig. 3. Fig. 5 represents a cross-section on the line C D, shown in Fig. 4, and Fig. 6 represents a perspective view of a modification of the device.

Similar letters refer to similar parts wherever they occur on the different parts of the drawings.

The invention consists of a series of clamping jaws or levers, *a a a a*, the lower ends of which are pivoted at a' a' a' a' to the base *b*, having recesses for the reception of the lower ends of said levers *a*, as shown in the drawings.

c represents a screw-tap of the usual make, having longitudinal grooves c' c' c' c' between the threaded portions c'' c'', as is common in taps of this kind. The inner faces, a'' a'', of the clamping-levers *a a* are made convex, as shown in Fig. 5, so as to fit into and cover or mask the grooved portions c' c' of the screw-tap *c* when the clamping-levers *a a* are closed against the said-tap *c*, as shown in Figs. 1, 3, 4, and 5. The levers *a a* are held in a clamped position against the sides of the tap or other article that is to be hardened by means of a metal ring or annulus, *d*, or other suitable clamping device, that is forced over the outer tapering faces, a^3 a^3, of the levers *a a*, as shown in Figs. 3 and 4.

The manner of using the invention is as follows: The ring *d* is removed and the levers *a a* expanded, as shown in Fig. 2. The screw-tap is heated, as usual, to the desired temperature and placed in position between the levers *a a*, its lower end resting on the base *b*, as shown in said Fig. 2. The clamping-levers are then rapidly brought together, so that their inner convex faces, a'' a'', will rest in and mask or cover the grooves c' c' on the screw-tap, as shown in Fig. 5, and the ring or annulus *d* is driven over the outer tapering faces, a^3 a^3, of the levers *a a*, so as to clamp the screw-tap firmly between said levers, as shown in Figs. 3 and 4. The whole is then quickly plunged in water or other liquid, or such liquid dashed over the whole, as may be most convenient, and withdrawn from the liquid after the hardening of the tool is accomplished. After the tool has cooled sufficiently, the ring or annulus *d* is removed, the clamping-levers are spread apart, the screw-tap is removed, another heated one clamped between the levers, and the operation repeated, as above described.

In hardening screw-taps it is very essential that they should not contract in a longitudinal direction, and thereby to preserve the original pitch of the screw-thread, and this is accomplished by the clamping-levers *a a* fitting closely and bearing against the longitudinal grooves c' c'. As the heated tap and the hardening device are plunged in water or other cool liquid, the threaded portion of the tap is exposed to the liquid, while the grooved portions, being masked or covered by the clamping-levers, are not exposed to the cooling-liquid, and are therefore not chilled, thus counteracting the longitudinal contraction of the exposed parts, and thereby retaining the original pitch of the screw-thread on the tap. The warping of the tap is prevented by its being confined throughout its length between the clamping-levers.

In hardening mandrels, flat and twist drills, or other articles where a longitudinal contraction is immaterial, I do not mask the sides of

such articles, and consequently the inner faces of the clamping-levers may be made flat or V-shaped or convex, it being only desired to confine such articles firmly between the clamping-levers during the process of hardening, so as to prevent such articles from being warped or cast out of true in a longitudinal direction.

I do not wish to confine myself to a solid single-piece base, *b*, as shown in Figs. 1, 2, 3, 4, and 5, as where the device is to be used interchangeably for articles of varying diameters I propose to make it as shown in Fig. 6, where the lower ends of the clamping-levers *a a* are pivoted to jaws *b' b'*, that are radially adjustable on the disk or plate *b''* in the same manner as scroll or lathe chucks are made.

What I wish to secure by Letters Patent, and claim, is—

1. The hardening device, as described, consisting of a series of clamping jaws or levers, *a a*, pivoted in one end to a base-plate, *b*, or its equivalent, with inner convex faces adapted to fit or mask the grooves on screw-taps, and having means, substantially as described, for clamping the article between such levers, as and for the purpose set forth.

2. The hardening device, as described, consisting of a series of clamping jaws or levers, *a a*, pivoted in one end to a base-plate, *b*, or its equivalent, in combination with the clamping ring or annulus *d*, substantially as and for the purpose set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 19th day of December, A. D. 1887.

JOHN G. FOLSOM.

Witnesses:
FRANK P. SPALTER,
EZRA C. LAMB.