W. S. BIRKS.

CLAMPS FOR STRAIGHTENING FILES IN HARDENING.

No. 194,762. Patented Sept. 4, 1877.

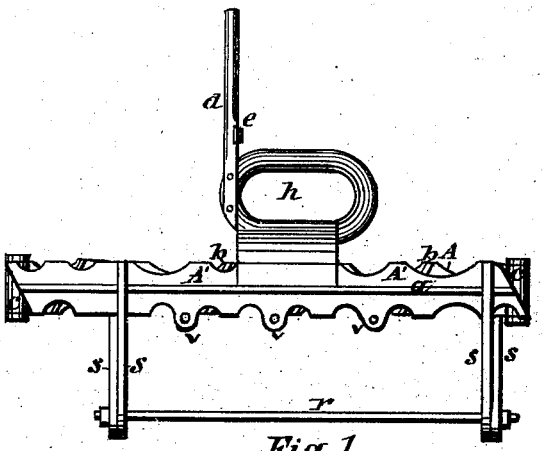

Fig. 1

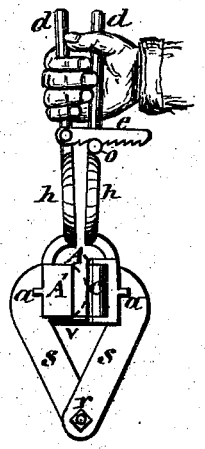

Fig. 2

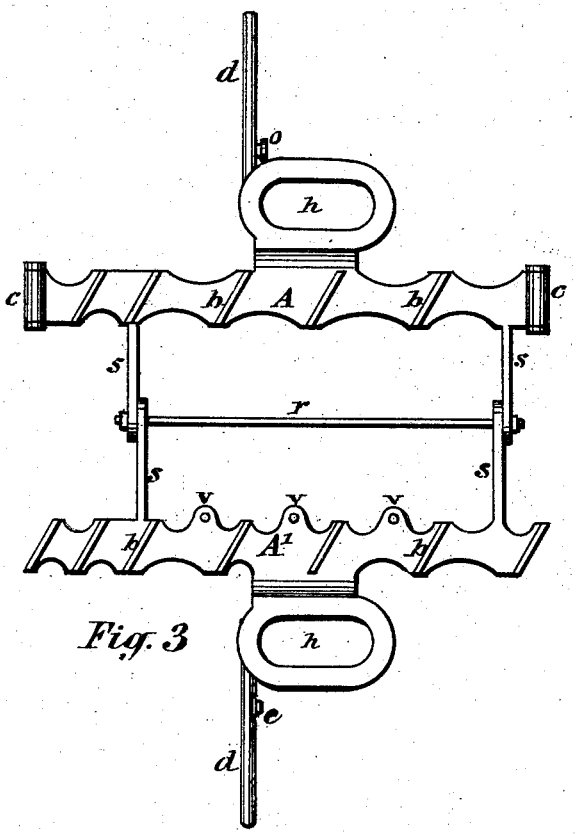

Fig. 3

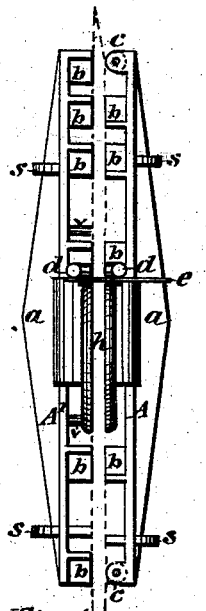

Fig. 4

Witnesses:
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UNITED STATES PATENT OFFICE.

WALTER S. BIRKS, OF SYRACUSE, NEW YORK.

IMPROVEMENT IN CLAMPS FOR STRAIGHTENING FILES IN HARDENING.

Specification forming part of Letters Patent No. **194,762**, dated September 4, 1877; application filed March 8, 1877.

To all whom it may concern:

Be it known that I, WALTER S. BIRKS, of Syracuse, in the county of Onondaga and State of New York, have invented new and useful Improvements in Straightening Files during the process of hardening the same, of which the following, taken in connection with the accompanying drawing, is a full, clear, and exact description.

This invention relates to a simple, convenient, durable, and effective tool for straightening files during the process of hardening the same, by means of which the work can be accomplished more perfectly and with a great saving in files as well as in time.

It is a well-known fact that the greater portion of files, especially the so-called half-round files, will, when subjected to the process of hardening, warp or bend endwise, and require to be straightened before deprived of sufficient temper to allow them to yield to the strain incident from the straightening. To accomplish this straightening of the file with any degree of safety against its breaking, it is necessary to have full control of the application of the strain, and requires a great deal of judgment and experience on the part of the operator, especially when done under the old process. This process consisted in placing one of the upward-sprung ends of the file, after being partly hardened, transversely between two rigid bars, usually termed "straining-irons," and bearing upon the free end with one hand, while applying water and completing the hardening of the file with the other hand. This process, being slow and uncertain in its effects, both as to perfection in the straightness of the file and liability of breaking it by bending it to excess, rendered the operation very expensive. This is almost entirely obviated by the use of my tool.

My invention is clearly illustrated in the accompanying drawing, wherein Figure 1 is a side view; Fig. 2, an end view; Fig. 3, a view of the tool opened or unfolded for receiving a file; and Fig. 4 a top view of the tool closed upon a file.

Similar letters of reference indicate corresponding parts.

A A′ are the file-straightening bars proper, in the form of leaves or jaws of a clamp or vise, hinged to work parallel to each other by a rod, *r*, passing through the end of shanks *s* extended from the outside of the jaw downward. These jaws are stiffened by a longitudinal rib, *a*, on their outside, and are provided on their inner surface with a series of bearing-points, *b b*, of such form and construction that their pressure upon the file will allow the same to be straightened without injury to its surface.

For the greater portion of files I prefer to make the bearing-points *b b* in the form of teeth or ridges, arranged either transversely or diagonally across the jaw, and graduate the distances between them increasingly from the end of the jaw which bears upon the small and generally most deflected end of the file toward the opposite end of the jaw.

The jaw A′ is provided at its lower edge with inward-projecting spurs *v v* for holding the file in its position while opening and closing the clamp. The file is placed with its convexity upon the jaw A′, and the jaw A closed upon it, thus causing the end of the latter to first come in contact with the ends of the file, and, since the straightening of the same distends its ends, considerable friction is caused at that point. To obviate this I attach to one or both ends of the jaw A the anti-friction rollers *c*, which may also be arranged at other points of the jaw, and substitute the teeth *b*.

The jaw A′ may be constructed of two longitudinally-hinged sections, so as to adapt it for straightening round and square files; and, if desired, set-screws may be connected with either jaw for straightening the file edgewise.

Since the pressure has to be applied gradually and yet rapidly, sufficient to accomplish the straightening before the file becomes too hard and thus cause it to break, it is essential to give the operator full control of the pressure. For this purpose each of the leaves A A′ is provided with a handle, *h*, of such form and construction as to enable the operator to grasp and force them together by hand.

For small files these handles furnish sufficient purchase for applying the requisite pressure for straightening the file; but for large files extra levers *d d*, connected with the handles, are required to obtain the necessary

power, as illustrated in Fig. 2 of the drawing. C is a ratchet-bar attached to one of the levers, and engaging a ratchet-pin, *o*, on the other lever, for the purpose of retaining the pressure applied.

Although this construction and arrangement of the handles *h* and levers *d* furnish very convenient and effectual means for applying the pressure required for straightening files and for manipulating the tool generally, yet the object of my invention can be attained by dispensing with the levers *d d* and substituting therefor a set-screw connected with the handle *h* for drawing the jaws together, also by dispensing with both the described handles and levers and substituting therefor handles in the shape of bars attached lengthwise to and projecting at the end of the jaws.

It will be observed that by my invention the files are invariably made straight without danger of breaking them by bending them over the proper limits; and it will be especially appreciated in operating upon re-cut files, as they are of uneven temper, and require various pressure for straightening.

Having thus described my invention, what I claim is—

1. A file-straightening tool composed of two leaves hinged to each other at their side, and provided with bearings *b* on their adjacent surfaces, and a handle, *h*, attached to each leaf, constructed to operate substantially as described, for the purpose set forth.

2. In a file-straightening tool, the arrangement of the bearings *b b*, having the distances between them gradually increasing from one end of the leaf, substantially as described, for the purpose specified.

3. The combination and arrangement of the jaws A A′, having shanks *s* extended from their outside downward, and hinged by the rod *r* passing through the ends of said shanks, and stiffened by the rib *a* on the outside, and provided with teeth or ridges *b* on their inner surface, the jaw A′ having, at its bottom edge, the inward-projecting spurs *v v*, and the jaw A, provided with anti-friction rollers *c*, constructed substantially as described, for the purpose specified.

4. The combination, with the leaves A A′ provided with ridges or teeth *b b*, of the anti-friction rollers *c*, substantially as and for the purpose set forth.

5. In combination with the jaws A A′ provided with handles *h h*, the levers *d d*, substantially as described and shown, for the purpose set forth.

In testimony whereof I have signed my name in the presence of two attesting witnesses, at Syracuse, in the State of New York, this 3d day of March, 1877.

WALTER S. BIRKS.

Witnesses:
E. BENDIXEN,
JOSÉ CUST. A. LIMA.