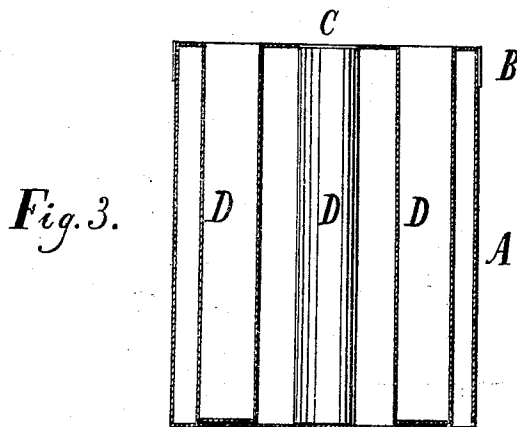
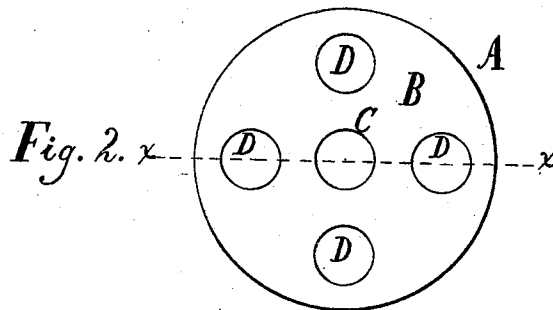
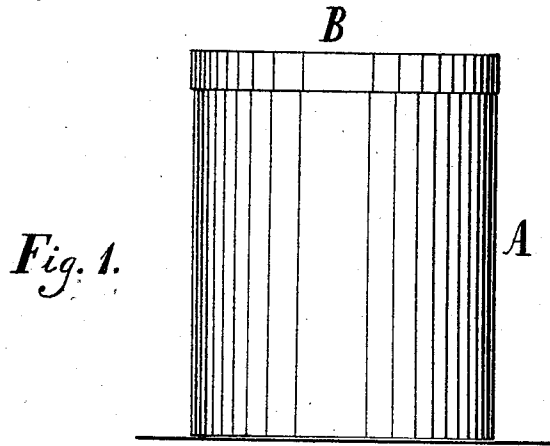


C. ENGEL.

Apparatus for Tempering Files, &c.

No. 147,114.

Patented Feb. 3, 1874.



Witnesses:

N. P. Grant.

E. S. Ketherington.

Inventor:
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attys.

UNITED STATES PATENT OFFICE.

CHRISTIAN ENGEL, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN APPARATUS FOR TEMPERING FILES, &c.

Specification forming part of Letters Patent No. **147,114**, dated February 3, 1874; application filed November 7, 1873.

To all whom it may concern:

Be it known that I, CHRISTIAN ENGEL, of the city and county of Philadelphia and State of Pennsylvania, have invented a new and useful Apparatus for Heating and Hardening Files and Metals; and I do hereby declare the following to be a clear and exact description of the nature thereof, sufficient to enable others skilled in the art to which my invention appertains to fully understand, make, and use the same, reference being had to the accompanying drawings making part of this specification, in which—

Figure 1 is a side elevation of the device embodying my invention. Fig. 2 is a top or plan view thereof. Fig. 3 is a central vertical section in line *x x*, Fig. 2.

Similar letters of reference indicate corresponding parts in the several figures.

This invention consists in a closed pot or crucible, in which are arranged a series of tubes closed at bottom and open at top, and designed as receptacles for the files or pieces of metal. Lead is employed as the heating and hardening medium, which, when melted, by being placed in the pot or crucible and the latter stood on the grate of the furnace or fire thereof, will possess an equable temperature throughout, as is characteristic of lead, so that the tubes are uniformly heated without liability of burning or injury from the fuel, and the files or metal are rapidly acted on by the heat without contact with the lead or fuel, or the smoke or gas of the latter, whereby the work will be rapidly and reliably accomplished.

Referring to the drawings, A represents a pot or crucible, and B a cap or cover placed thereon. An opening, C, is made in the cap or cover, and is designed for applying the heat-

ing medium. Within the pot A there are located a series of tubes, D, which are closed at the bottom and reach to the bottom of the pot A, and said tubes are open at the top, so that access is had thereinto by means of correspondingly-formed openings in the cap or cover at the points of junction of the tubes and cap.

The operation is as follows: Lead is employed as the heating and hardening medium, which is placed in the pot or crucible through the opening C. The pot is located on the grate of a furnace or the fire thereof, so as to melt the lead and reduce it to a red heat, and when this is accomplished the files or pieces of metal are placed in the upright or vertically-arranged tubes D, so as to be subjected to the action of heat in the tubes generated by the melted lead on the outside of said tubes.

The advantages are apparent. The tubes are not in contact with the flame or heat of the furnace, and the files or pieces of metal are free from the direct action of the lead and the smoke or gas of the fuel in the furnace. The tubes may be of various forms, and constructed of wrought or cast metal.

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

The pot or crucible A and tubes D D, arranged therein and adapted for operation with a heating medium, which is placed in the pot or crucible and heated from the outside of said pot or crucible, substantially as and for the purpose set forth.

CHRISTIAN ENGEL.

Witnesses:

W. S. DUNN,

JOHN A. WIEDERSHEIM.