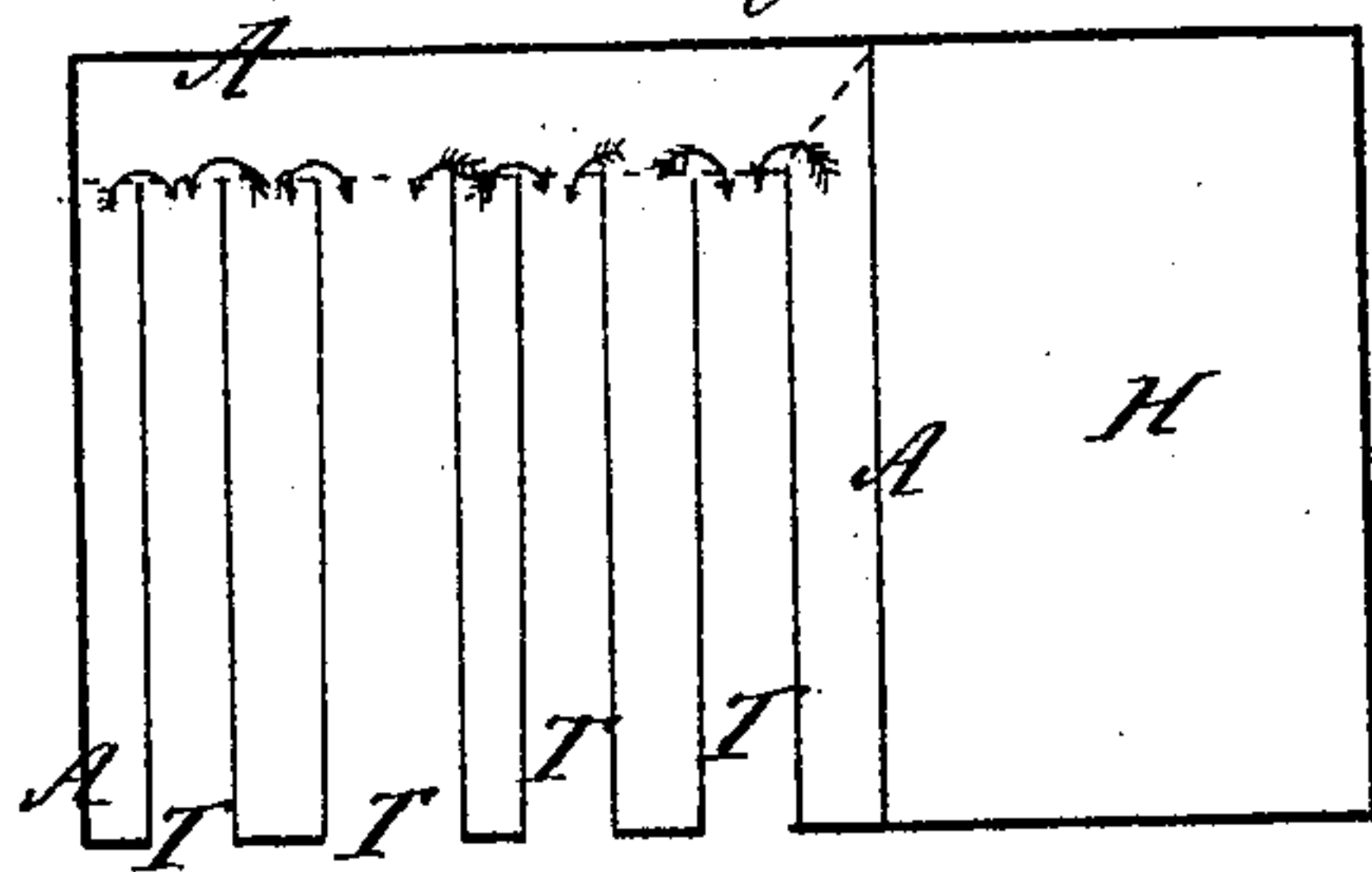


R. B. FELLOWS.  
Tempering Furnace.

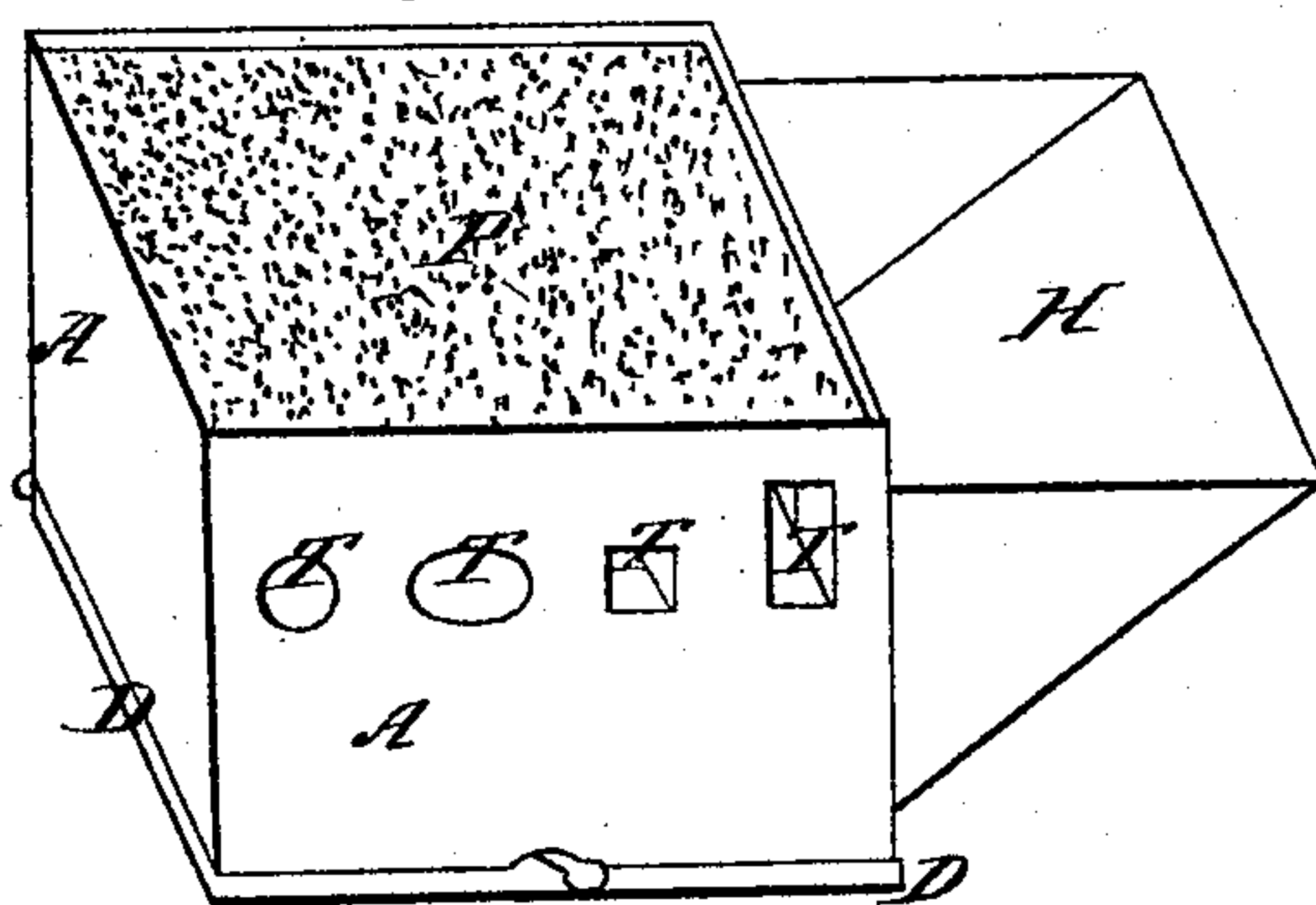
No. 14,601.

Patented Apr. 8, 1856.

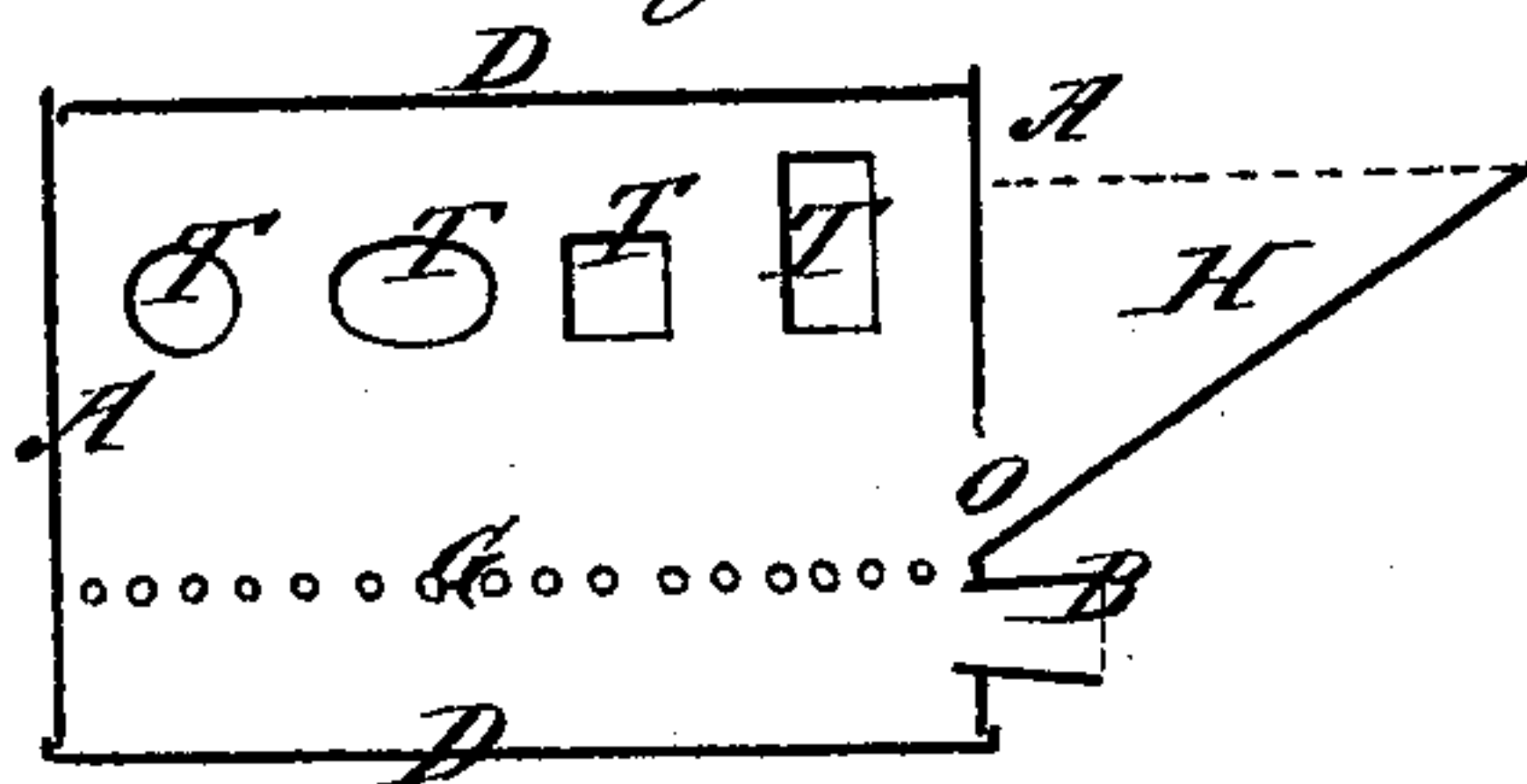
*Fig. 1.*



*Fig. 2.*



*Fig. 3.*



# UNITED STATES PATENT OFFICE.

ROBERT B. FELLOWS, OF SHELBURNE FALLS, MASSACHUSETTS.

## TEMPERING-FURNACE.

Specification of Letters Patent No. 14,601, dated April 8, 1856.

*To all whom it may concern:*

Be it known that I, ROBERT B. FELLOWS, of Shelburne Falls, in the county of Franklin and State of Massachusetts, have invented a new and useful Improvement in Tempering-Furnaces; and I do hereby declare that the following is a full and exact description of the same, reference being had to the accompanying drawings and to the letters of reference marked thereon, in which—

Figure 1 is a plan of the furnace showing the arrangement of the tubes; Fig. 2 is a perspective view of the furnace, and Fig. 3 a transverse section of the same.

The nature of my invention consists in the combination of a tempering plate, or sand bath with the fire by which the articles to be tempered are heated for the first part of the process of tempering, (usually called the "hardening") and also the use and peculiar arrangement of tubes of cast iron, in which to heat such articles for the "hardening" aforesaid; the several uses and advantages of which will appear from the following description, said furnace being chiefly applicable to the tempering of saws, cutlery, and other light articles of steel.

The frame A, is constructed of brick or iron, of such dimensions as to adapt it to the particular work for which it is designed, and when desired may be lined with fire brick or other similar resistant of heat. Upon one end of said frame (or upon both when desired) is arranged a suitable hopper, H, as a receptacle for coal, from which the opening o communicates with the interior of the furnace, and through which the coal is passed or fed upon the grate G, where it constitutes the fire within the furnace, impelled by the blast of a suitable bellows or blower, communicated through the blast-pipe B, below the said grate G. The door D, is hinged upon the lower side of the frame A, closing upwardly against said frame, thereby forming a chamber or chest for receiving the embers below the grate, which are discharged therefrom by the downward opening of said door.

Above the coal upon the grate, and at suitable distance therefrom, are inserted such number as may be desired of cast iron tubes as shown at T, T, T, T, of such quality and thickness as to withstand for a considerable length of time, the combined ac-

tion of the heat and the gases to which they are exposed; and of such form and dimensions as are best adapted to the particular articles to be tempered. These tubes are open at both ends, one being exterior, the other within the furnace, as shown in Fig. 1. Upon the top of the frame A, is fitted the plate P, overlaid with a coating of sand, of suitable depth for any particular work, as for instance, for cutlery from one-fourth to one-half of an inch; for small saws from one-half to three-fourths of an inch which depth will, however, be varied to suit either the experience or the caprice of different operators.

The fire being in proper blast within the furnace, the articles to be tempered are placed within the tubes T, &c., where (in consequence of the flame passing upwardly between and around said tubes, and when nearly spent, passing outwardly through the said tubes) they are heated to the proper degree for the "hardening" hereinbefore mentioned, when they are "plunged" or "dipped" in any cooling liquid, as usually done in "hardening" instruments of steel. They are then laid upon the sand upon the plate P, which plate and sand being heated by the fire in manner similar to the heating of the tubes and by the same fire aforesaid; the articles are thereupon heated to such a degree as to accomplish the "lowering" or "drawing" of their temper to the same extent and by the same tests as are usual in the heretofore common practice of employing separate workmen and separate fires for each of the operations of "hardening" and "drawing" as separate parts of the double process of tempering.

The use of the tubes, in the manner specified, accomplishes the heating of the articles to be tempered, without exposing them to oxidation or corrosion by the gases generated by combustion (their action being expended upon the cast iron of the tubes), and also produces an equal heat throughout their whole extent. They are not, however, indispensable, as an ordinary fire may be used in combination with the plate P by arranging the same with an opening through the side of the frame A, in place of the tubes; or a plane plate may be substituted therefor, while in either case the plate P, being arranged and combined as described, affords the facility of attention



to both parts of the double process of tempering by one operator, and by one fire only, thus saving nearly or quite one half of the expense of the process as now universally  
5 practiced.

I do not claim the hardening; or the plate P for "drawing" when accomplished or employed separately by separate fires; nor do I claim the use of the tubes or the plate  
10 beforementioned, except when combined and arranged as described. But

What I do claim as my invention and desire to secure by Letters Patent is—

The combination of the plate P and the tubes T or their equivalents, with a single  
15 fire, in the manner and for the purposes substantially as set forth.

ROBERT B. FELLOWS.

Witnesses:

FREDERIC A. BALL,  
WILLIAM S. HEATH.