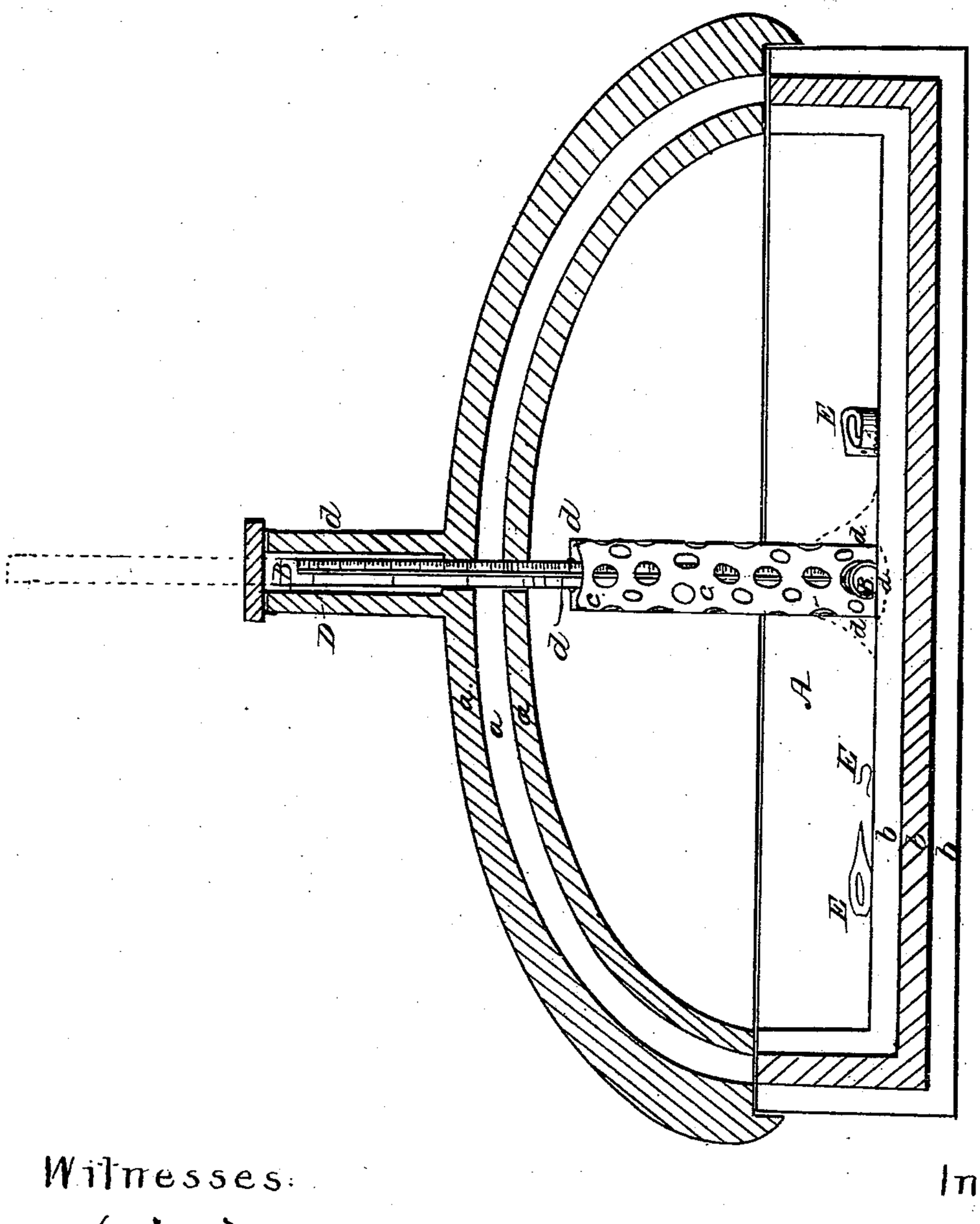
H. J. DICKERSON.

Refining Iron and Steel.

No. 84,480. Patented Dec. 1, 1868.



Witnesses:

A. H. Hart

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HENRY JAMES DICKERSON, OF APPLETON, WISCONSIN.

Letters Patent No. 84,480, *dated December* 1, 1868.

IMPROVED METHOD OF WORKING STEEL AND IRON.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, HENRY JAMES DICKERSON, of the city of Appleton, in the county of Outagamie, and State of Wisconsin, have invented a new, and useful, and improved Method of Working Steel and similar substances; and I do declare that the following is a full, clear, and exact description thereof.

My method is the application of a compound constituted by incorporating the following ingredients, substantially in or about the proportions hereinafter named, applied to the steel or similar substances, as an assistant, while working it to the desired form.

The ingredients of the compound are, one and one-half pound (1½ lb.) borax; four ounces (4 oz.) fine table-salt; four ounces (4 oz.) copperas; six ounces (6 oz.) sal-ammoniac; four ounces (4 oz.) prussiate of potash; one ounce (1 oz.) rosin; one-half pint (½ pt.) rain-water.

Pulverize the ingredients finely, and mix all with the water in a shallow pan, and place over a slow fire. When the compound has become dry, pulverize again, and use the same as borax, except in less quantity.

For the purpose of refining and improving the quality of the steel and similar substances, I heat to a certain degree, and immerse in a compound constituted by incorporating the following ingredients, substantially in or about the proportions hereinafter named: One and one-half pound (1½ lb.) prussiate of potash; one and one-half pound (1½ lb.) tallow; two pounds (2 lbs.) rosin; one pound (1 lb.) sal-ammoniac; and, one-fourth pound (¼ lb.) bone-dust or fine horse-hoof.

In order to secure the requisite hardness, I heat to a certain degree, and immerse in a compound constituted by incorporating the following ingredients, substantially in or about the proportions hereinafter named: One-half barrel (½ bbl.) rain-water; two pounds (2 lbs.) saltpetre; two pounds (2 lbs.) alum; two pounds (2 lbs.) sulphate of iron; two pounds (2 lbs.) oxalic acid; and, two pounds (2 lbs.) prussiate of potash.

The articles of steel, or of similar substances, are then placed in a receptacle with one or more enclosing-surfaces. The space or spaces between said surfaces may be empty, or contain an assisting compound.

Connected with the interior is one or more thermometers, or other registering-instruments, for the purpose of determining, by the aid of heat, when the articles have reached the condition desired.

The receptacle (see drawing, which is included in and forms a part of these specifications) may be made of any suitable material, and of any appropriate form and size adapted to accomplish the purposes required by the method.

The figure presents a cross-section view through the centre of an elliptical vase, so as to show the relation of its arrangement to the objects of this method.

A A are the vase and cover, within which are placed the thermometer B B, or other registering-instrument, and articles to be improved, with such compounds as may be required.

B B B is the thermometer or other registering-instrument, which may rest in or on the bottom of the vase at *d*, or be held near the top of the vase at *d*, or suspended at any point within the case, indicated by letters *d d d d* and dotted lines.

c is a perforated case or shield to the registering-instrument, to prevent violent contact and injury from the articles placed within the receptacle to be improved or tempered. This shield may form a part of the vase itself, (see dotted line,) or be connected with the shield D, and have a transparent opening for observation of the register, and a cap permitting the withdrawal of the registering-instrument at any time desired.

Letters *a a a* show spaces between the surfaces of the cover enclosing the receptacle, which may be filled with an assisting compound, affecting the interior, if desired, through perforations or otherwise.

Letters *e e e* represent articles in process of improvement.

Having described my method, I will proceed to inform those skilled in the art how to use it successfully.

Select a suitable piece of steel (or similar substance, as alloys, &c.) for the purpose designed. I place it in the fire until quite hot; then, taking it out of the fire, I coat it with some of the compound first mentioned, and return it to the fire till of a much higher heat than customary, without injury to the steel, &c. Again coating it, work to the desired form, &c. Then reheat to the usual degree for working cast-steel, and place it in the compound second mentioned above. Allow it to cool, which refines and improves the quality of the substances. It is then evenly and carefully reheated to a dark red, and thrust into the third above-described compound, which produces a higher degree of refinement, and also a higher degree of hardness, which is, with aid of heat, reduced with greater accuracy than by any other known method to the point of softness, elasticity, and refinement required, by the use of the receptacle-thermometer or heat-registering instrument, shown in the drawings above described. The articles are then ready for polishing or use.

The great difficulty of securing a uniformity of production, and the refinement and accuracy of quality demanded in many instruments and articles of steel and similar substances, makes such an attainment as is reached by this method a matter of great importance. It is thought that the time saved in extensive manufacture, by improving so many articles at once, is not a small consideration in its favor; while the scientific character, perfection, and ease with which this method may be applied to one of the most important branches of industry, it is thought, will bring it into general use and commendation.

Having described my invention and its operation,

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

1. The working of steel and similar substances, more readily and with better results, by the assistance of the above first-described compound, applied for the purpose substantially as described.

2. The refinement of steel and similar substances, by the application of the second compound, in the manner, and substantially as described.

3. The refinement and hardening of steel and similar substances, by the application of the third compound, in the manner, and for the purpose, and substantially as described.

4. The accurate attainment of the desired quality in many articles at once, by the use of the receptacle and instruments above described, in the manner and substantially as set forth.

HENRY JAMES DICKERSON.

Witnesses:

JOHN E. PORTER,

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