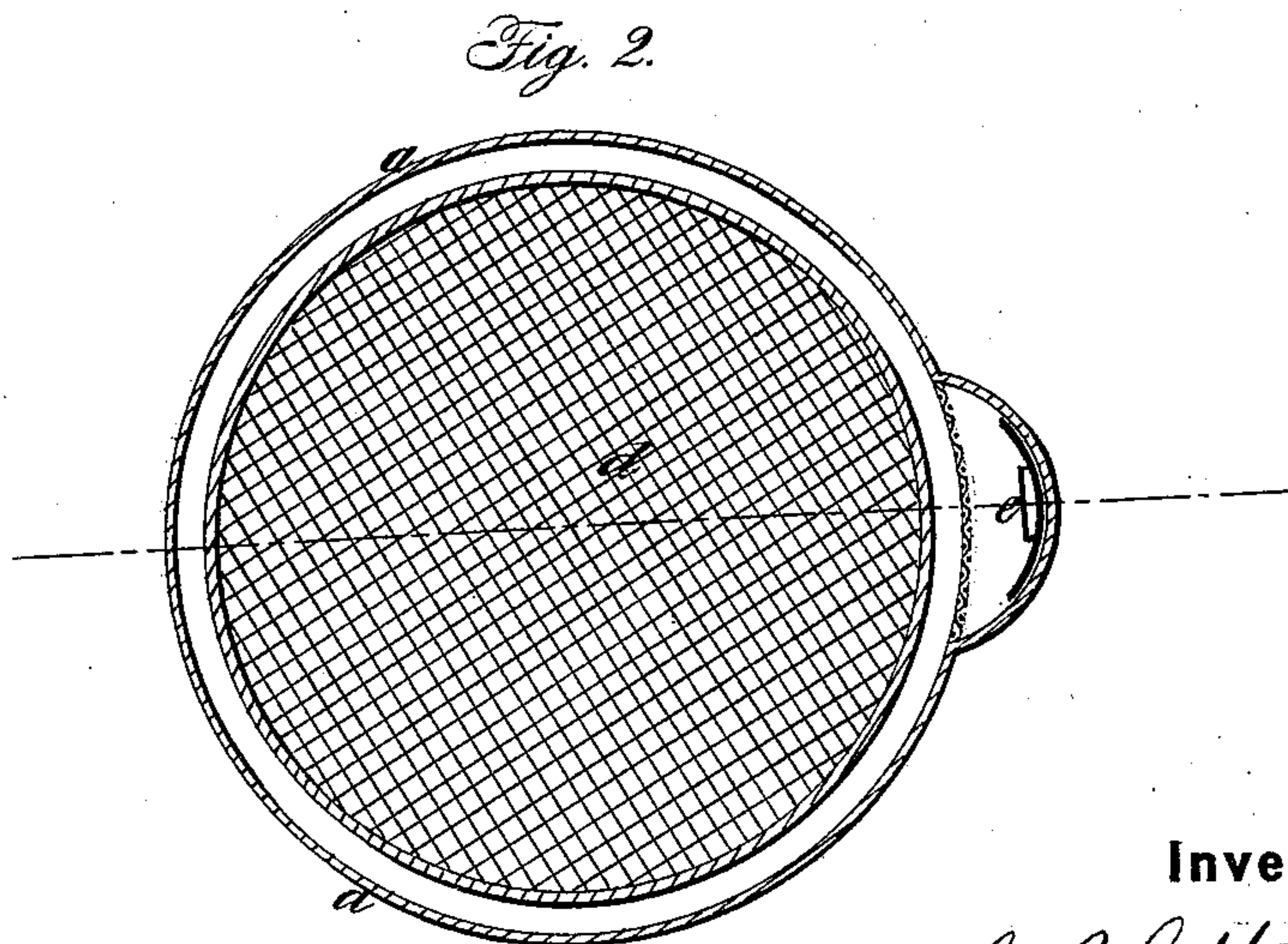
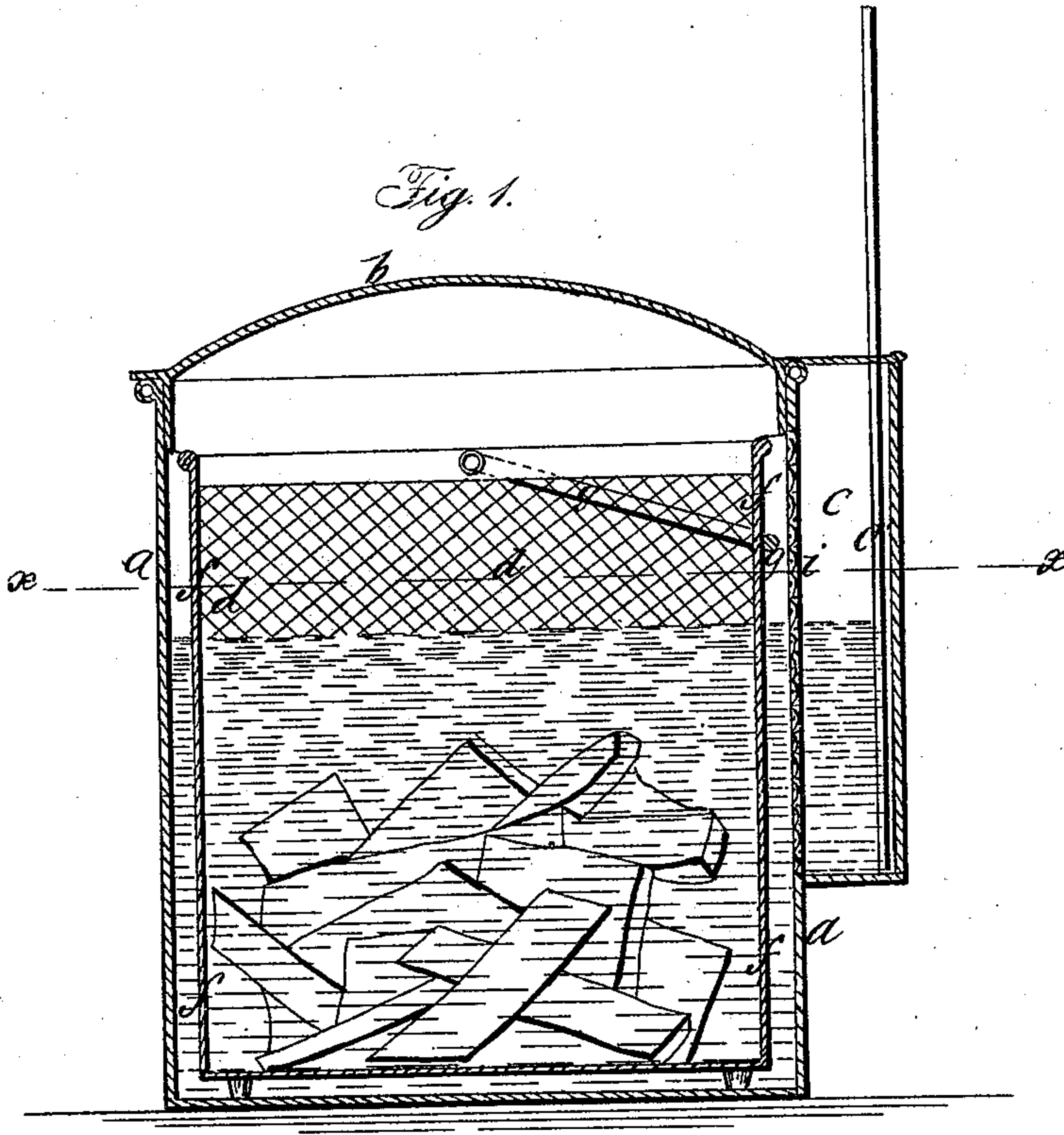


C. B. COTTRELL.

Tempering Steel.

No. 55,004.

Patented May 22, 1866.



Witnesses:

Wm. Brown
Thos. Lusk

Inventor:

C. B. Cottrell
By *Wm. H. H. Co.*
Attys

UNITED STATES PATENT OFFICE.

C. B. COTTRELL, OF WESTERLY, RHODE ISLAND, ASSIGNOR TO HIMSELF
AND NATHAN BABCOCK, OF SAME PLACE.

IMPROVED APPARATUS FOR TEMPERING STEEL.

Specification forming part of Letters Patent No. 55,004, dated May 22, 1866.

To all whom it may concern:

Be it known that I, C. B. COTTRELL, of Westerly, in the county of Washington and State of Rhode Island, have invented a new and useful Improvement in Draw-Tempering Steel; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawing, forming part of this specification.

This invention relates to the draw-tempering of steel by means of heated tallow, oil, and other oleaginous media; and my improvement consists in so constructing the vessel in which the tempering is done as to prevent the ignition of the tallow or oleaginous media during the tempering process.

The common method of draw-tempering steel is by means of a fire or flame, and each piece of steel is separately taken by the workman and held in-flame and separately tempered. It is upon the skill and judgment of the workman that reliance must be placed in order to obtain good tempering; but in no case can uniformity in the tempering of different pieces of steel be secured, and the process is very slow, tedious, and expensive.

By the use of my improvement I am enabled to temper a large quantity of steel, in different pieces, all at one operation, and I am also enabled to bring all the pieces up to the same quality of temper with great exactness and certainty.

Attempts have been made to draw-temper steel by the use of oils and tallow in open vessels; but these attempts have failed, owing to the inflammability of the tallow or oils when highly heated and the impossibility of preventing them from igniting before the requisite number of degrees of temperature for tempering the steel could be obtained.

My improvement overcomes the above difficulties and enables me to use tallow, oils, and other oleaginous products with the utmost safety, economy, and success.

In accompanying plate of drawings one form of vessels is illustrated for operating my process or mode of draw-tempering steel, Figure 1 being a central vertical section of the same,

and Fig. 2 a horizontal section taken in the plane of the line *x x*, Fig. 1.

a a in the drawings represent a vessel, made of a cylindrical form, and of sheet-iron, tin, or any other suitable metal for resisting the action of the heat to which it is to be subjected, having a cover, *b*, for closing the same and a thermometer-chamber, *c*, in which a thermometer, *c'*, can be introduced for indicating the degree of heat to which the tallow placed in the vessel has been raised when the vessel has been subjected to heat on any suitable heating-furnace. The thermometer-chamber, although its outer wall forms a part of the wall of the vessel, is separated from the body of the vessel by an inner wall or diaphragm, *i*, which is perforated or composed of gauze, so as to permit the contents of the vessel to enter the thermometer-chamber.

My improvement is applicable to the tempering of tool-blades of all kinds, in large quantities, at one operation.

d, a basket-shaped inner vessel, made with perforated sides *f*, and of a little less diameter than the vessel *a*, so that it can be readily inserted therein or removed therefrom at pleasure, a bail, *g*, being provided for convenience in handling the same. In this basket *d* the steel to be draw-tempered is placed, and then it, in turn, inserted in the vessel, the tallow therein first, however, having been raised to, or nearly so, the temperature of 400°, or, in other words, to the highest degree to which it can be raised without blazing, when the cover is closed and the whole raised to 550° Fahrenheit if the steel is to be used for tool purposes, or to 650° Fahrenheit if for springs, after which the cover is opened and the steel removed by lifting out the basket. The basket is then charged again, and so on as long as may be desired or necessary.

I do not confine myself to any particular form of vessel, nor to any special method of closing the same, because there are various forms in which vessels can be made by which the tempering process may be conducted and the ignition of the tallow be at the same time successfully prevented.

Having thus described my invention, I claim—

1. In the draw-tempering of steel, the employment of a vessel constructed, substantially as described, so as to admit of the tempering process and prevent the ignition of the tallow, oil, or other oleaginous tempering medium, as herein set forth.

2. The employment of an independent perforated basket for holding the steel, in combi-

nation with the oil-vessel, constructed substantially as herein described.

The above specification of my invention signed by me this 12th day of July, 1865.

C. B. COTTRELL.

Witnesses:

M. M. LIVINGSTON,

C. L. TOPLIFF.