

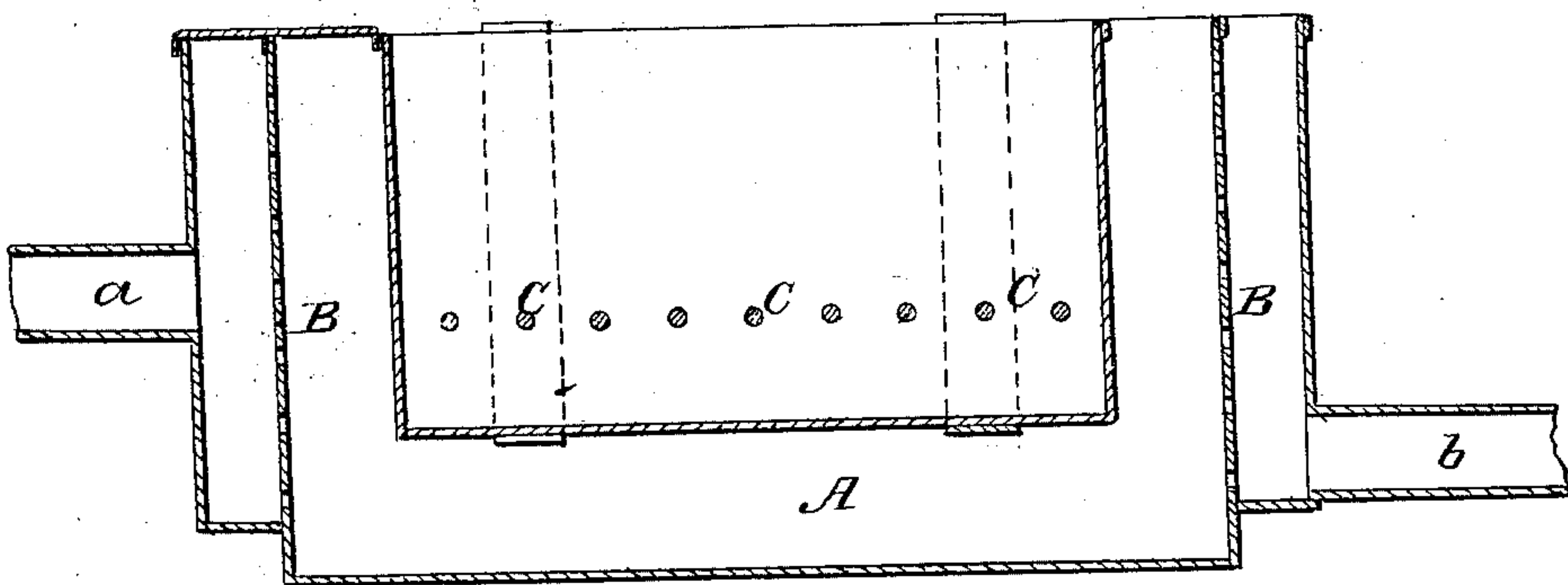
WHYSALL & PORRITT.

Tempering Springs.

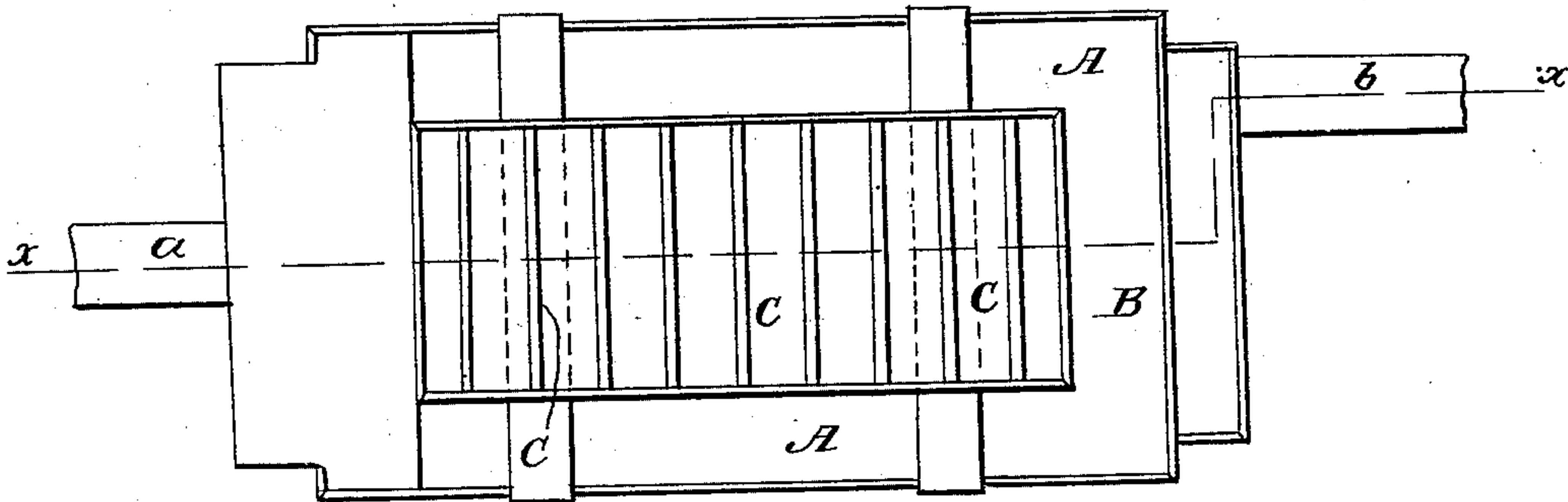
No. 58,031.

Patented Sept. 11, 1866.

*Fig. 2.*



*Fig. 1.*



Witnesses:

*J. M. C. [Signature]*  
*Lester F. G. Dietrich*

Inventors:

*B. Whyhall*  
*J. Porritt*  
*by M. M. [Signature]*

# UNITED STATES PATENT OFFICE.

B. WHYSALL AND J. PORRITT, OF PORT JERVIS, ASSIGNORS TO THEMSELVES  
AND M. M. LIVINGSTON, OF BROOKLYN, NEW YORK.

## IMPROVEMENT IN TEMPERING SPRINGS.

Specification forming part of Letters Patent No. 58,031, dated September 11, 1866.

*To all whom it may concern:*

Be it known that we, B. WHYSALL and J. PORRITT, both of Port Jervis, in the county of Orange and State of New York, have invented a new and Improved Process of Tempering Springs, Wire, &c.; and we do hereby declare that the following is a full, clear, and exact description of our said invention.

In tempering springs, wire, and other articles, the practice has heretofore been to heat the articles to the requisite degree of heat in any proper medium, and while hot immerse them in a vat of oil to harden and cool them. The articles are then removed from the oil and subjected again to a heat necessary to produce the desired temper. This is the process commonly employed. We are aware of other processes; but in all of them it is necessary to subject the articles to a second heating or burning-off operation.

The object of our invention is to dispense with the last heating of the metal, thereby effecting a great saving in time and expense.

Our invention or process consists in tempering springs, wire, &c., by subjecting the same, after having been heated to the requisite degree of heat, to the action of a bath composed of such chemical agents as shall harden and temper the same, and this without the necessity of subsequently subjecting the springs, &c., to a second heating or burning-off operation.

We have found by practice that a bath composed of the following ingredients will accomplish the purpose of our invention or process: linseed-oil, (raw or boiled,) resin, lamp-black, and vitriol.

In carrying out our process we find it advantageous to use a tank substantially such as is illustrated in the accompanying drawings—

Figure 1 being a plan or top view, and Fig. 2 a longitudinal vertical section taken on the plane of the line *x x*, Fig. 1.

A designates a tank, which may be of any appropriate size or shape. In one end of the tank there opens a feed-water pipe, *a*; from the other emanates a waste-water pipe, *b*; and in front of the mouth of each pipe, across the tank A, there is secured a perforated plate, B. By using these plates B a more even current

of water is insured in the main body of the tank.

C is the bath-tub. This is suspended in the tank A in a suitable manner. Across its interior a series of bars are secured, forming a grating, *c*, on which rest the springs or other articles placed in the bath. They are thus held in the midst of the bath, so that all parts can be effectively reached by the bath.

In a bath-tub of the proper dimensions we deposit linseed-oil, (raw or boiled,) twenty gallons; resin, five pounds; lamp-black, three pounds; blue vitriol, one pint.

The resin should be dissolved in a sufficient quantity of the oil to take it up, and then added to the oil in the vat. The lamp-black and vitriol may then be added, and the whole mass stirred until properly mixed.

The resin and lamp-black so thicken the oil that it does not have the power to cool the metal so quickly as to make it too brittle. It cools it gradually. This we deem beneficial in the tempering of springs.

The vitriol is not essential for the effective qualities of the bath; but it may be used to allay or destroy the smell, which would otherwise arise when the heated metal is subjected to the bath.

Substitutes may be used for the lamp-black—for instance, a liquid made by boiling down animals' hoofs in the same kind of oil used in the bath may be used in lieu of the lamp-black.

The resin greatly-enhances the hardening effect of the bath.

In tempering wire the same had better first be brought to the requisite heat, which can be done either by placing it in a coil or upon an open reel in a fire or in a retort or reverberatory furnace, from either of which it may be removed while hot and quickly immersed in the bath. When taken out it will be found to have received the requisite temper, thus dispensing with the necessity of subjecting it to the subsequent action of a heating medium, as is now practiced.

We will remark, in this connection, that we find it advantageous to heat the bath before immersing the wire, and thus the degree of temper given to the wire may be regulated according to the degree of heat of the bath.



It will be understood from the above description that we are able to harden, cool, and temper the metal by the mere action thereon of a bath, and that the metal, when removed from the bath, requires no subsequent heating in order to bring it to the desired temper.

We will here remark that we have tempered locomotive-springs and hoop-skirt wire by this process, and have had the locomotive-springs practically tested on the New York and Erie railroad, and they have been proven to be far superior to all metallic springs heretofore used, and require a less number of leaves than they do as heretofore made.

Hoop-skirt wire has also been tempered with success.

We will here remark that it may be advantageous, in the tempering of wire, to use in the bath bichromate of potash, say, one part; prussiate of potash, say, two parts; the tendency of which would be to make the wire

more brittle or flexible. These ingredients might be used with or without either or both the lamp-black and blue vitriol.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. The process of tempering springs, wire, &c., substantially as herein described.

2. For the purpose of hardening, cooling, and tempering springs, wire, &c., a bath composed of the chemical agents herein specified.

3. In carrying out our process, the employment of a vat, A, having a water-chamber, B, all around it, and pipes *a b*, letting into said chamber, whereby a constant current of cold water may be kept up for cooling the liquid in the vat A, as herein shown and described.

BANFORTH WHYSALL.

JAMES PORRITT.

Witnesses:

JAMES GREENHOLGH,

L. H. BECKWITH.