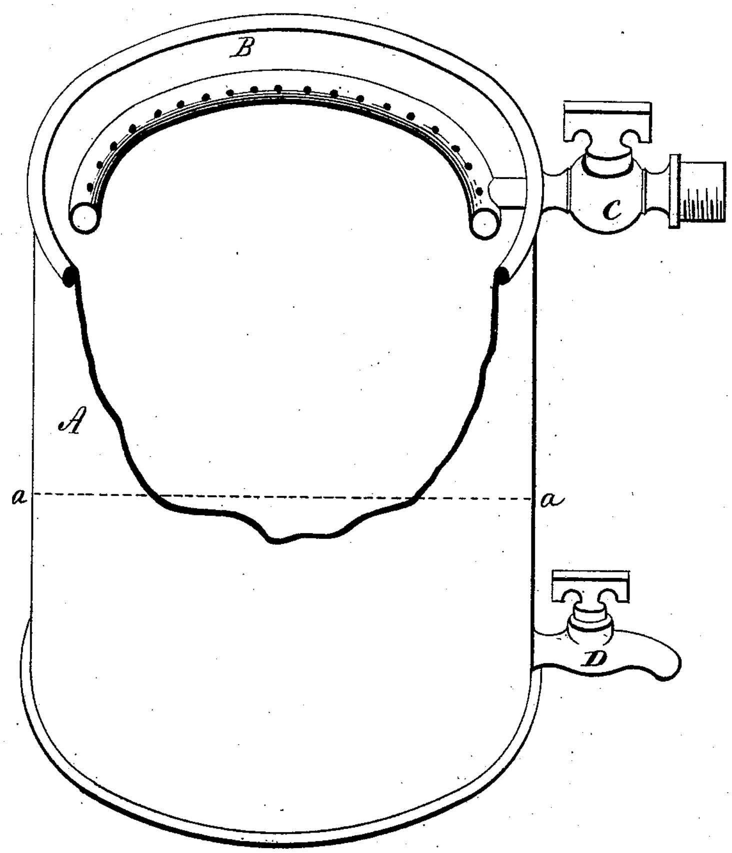
J. HUMPHREYS.
Bath for Tempering Steel.

No. 204,824. Patented June 11, 1878.



Witnesses.
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UNITED STATES PATENT OFFICE.

JOHN HUMPHREYS, OF NEW HAVEN, CONNECTICUT.

IMPROVEMENT IN BATHS FOR TEMPERING STEEL.

Specification forming part of Letters Patent No. **204,824**, dated June 11, 1878; application filed May 13, 1878.

To all whom it may concern:

Be it known that I, JOHN HUMPHREYS, of New Haven, in the county of New Haven and State of Connecticut, have invented a new Improvement in Baths for Tempering Steel; and I do hereby declare the following, when taken in connection with the accompanying drawing and the letters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawing constitutes part of this specification, and represents, in—

Figure 1, a sectional view.

This invention relates to an improvement in oil-baths for tempering articles of steel.

In the usual method, the bath consists of a vessel filled with oil, and where the tempering is of such a nature to require long-continued immersions of hot steel, the oil is gradually heated until it comes to a high degree. This high degree of heat in the bath materially interferes with the tempering; and, in order that the bath should not get above the required temperature, it is necessary that the work should be done slowly, or the workman must wait at intervals to allow the bath to cool.

The object of this invention is to insure a constant and unvarying temperature to the bath; and it consists in combining with the oil-bath an inflow of water and an outlet, so that the water will pass through the oil, and, falling to the bottom, will separate from the oil and pass out, leaving the oil above, and as more fully hereinafter described.

In the drawings, A represents a tank, which may be of any desirable form or size, it only being essential that it should be somewhat deeper than the full depth of oil required. Near the top a tube, B, is arranged around the tank, with numerous perforations. Into this tube or water-distributer the water is led from a fount through a cock, C, by means of which the supply may be regulated. Near the bottom of the tank an exit is made through a cock, D, by which the exit may also be regulated.

The requisite quantity of oil is poured into the tank—say sufficient to fill it about two-thirds full. Then the cock C is opened to admit water, which is discharged into the oil, and until the oil is raised, say, to or so as to cover the distributer B, the water naturally falling to the space, say, below the line *a a*. When arrived at this point the cock D is opened so as to allow a quantity of water to escape equal to the quantity admitted. Then, the discharge through the distributer continuing, the water works its way through and below the oil, then passing out, the depth below the oil before it arrives at the discharge being sufficient to allow of a complete separation of the oil from the water, so that no oil will be wasted.

It will be understood as the inflow of water is increased the discharge must be opened accordingly, and vice versa.

The bath is used for tempering in the usual manner—that is to say, the steel is heated and plunged into the bath to be cooled.

In proportion as the articles are larger or smaller, or as the work more or less rapidly imparts heat to the bath, the inflow and exit of water should be regulated accordingly; hence it is in the power of the workman to maintain a constant and regulated temperature of the bath, and without any of the delays or interruptions in the use of the ordinary bath.

The water-distributer may be arranged at any convenient point, not necessarily above the oil, but may be below the surface and near the bottom of the oil, but should be so that the water will be discharged with sufficient force into the oil to permeate through the oil and impart to it its cooling properties.

The essential feature of the invention is that there shall be such a discharge of water into the oil as to give it the required temperature, and a corresponding discharge for the water below the point where the complete separation of the oil from the water occurs.

In many classes of work, not to say all, the mingling of the water with the oil imparts beneficial qualities to the steel hardened therein; but in no case can it be detrimental.

I claim—

The herein-described bath for hardening or tempering steel, consisting of a body of oil with a body of water below it, and a flow of water into the oil and out of the body of water below the point where the water separates from the oil, substantially as described.

JOHN HUMPHREYS.

Witnesses:
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