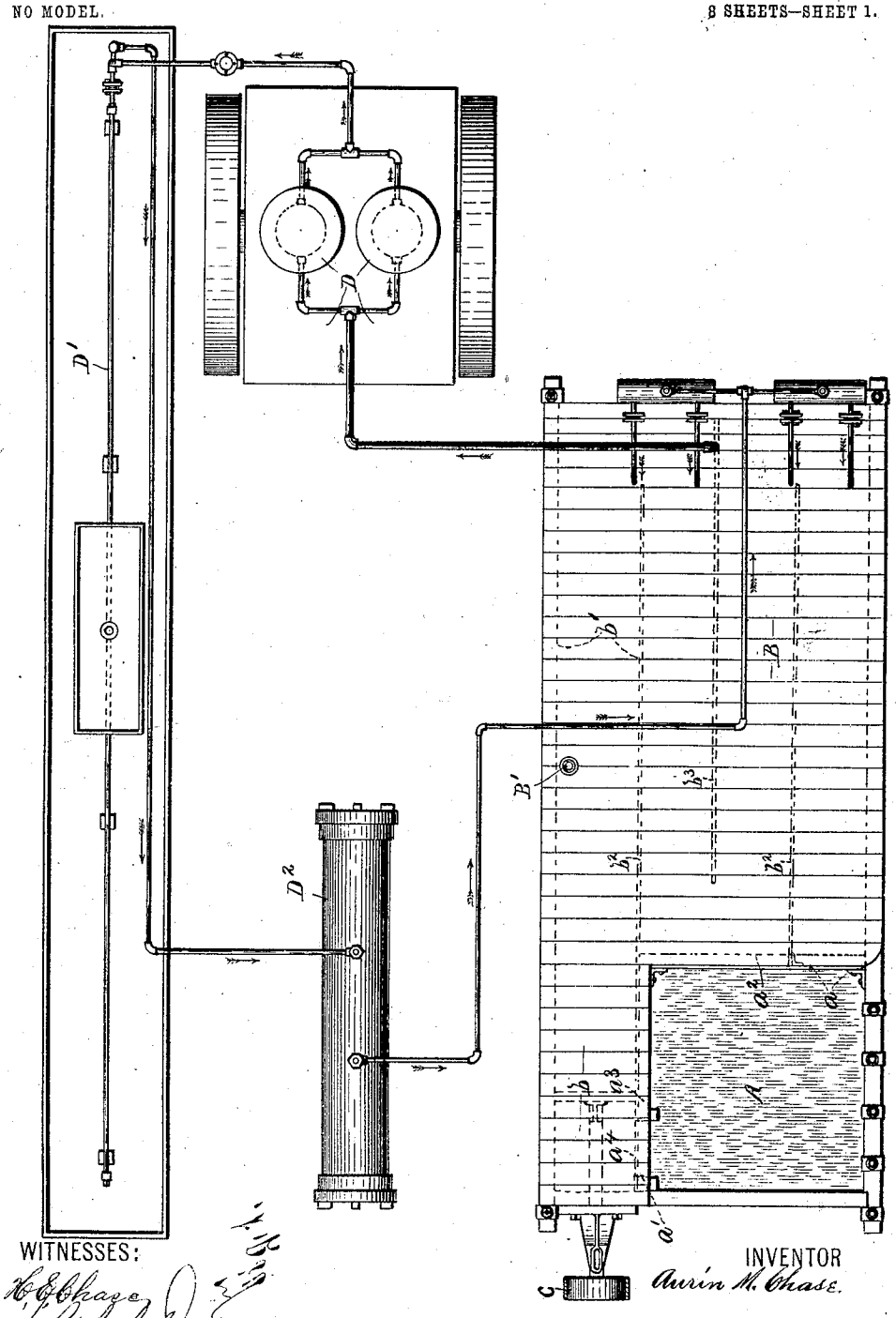
No. 737,079. PATENTED AUG. 25, 1903.

A. M. CHASE.

TEMPERING APPARATUS.

APPLICATION FILED MAR. 7, 1899.

NO MODEL. 8 SHEETS—SHEET 1.



WITNESSES:

H. C. Chase

J. L. Theobald.

INVENTOR

Aurin M. Chase.

BY

Key & Parsons,

ATTORNEYS

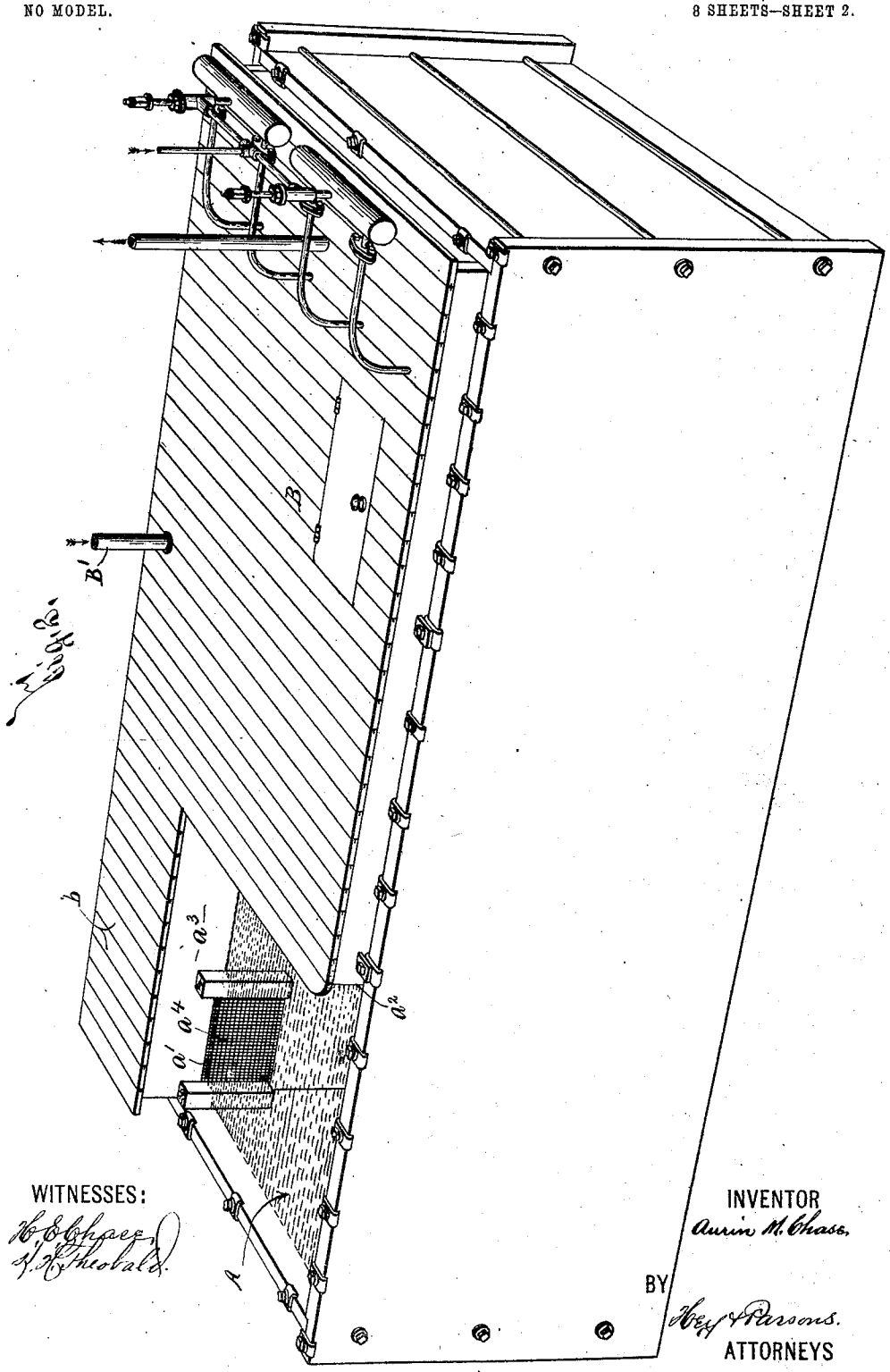
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A. M. CHASE.

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NO MODEL. 8 SHEETS—SHEET 2.



WITNESSES:

H. C. Chase.

F. K. Theobald.

INVENTOR

Aurin M. Chase.

BY

Hey & Parsons.

ATTORNEYS

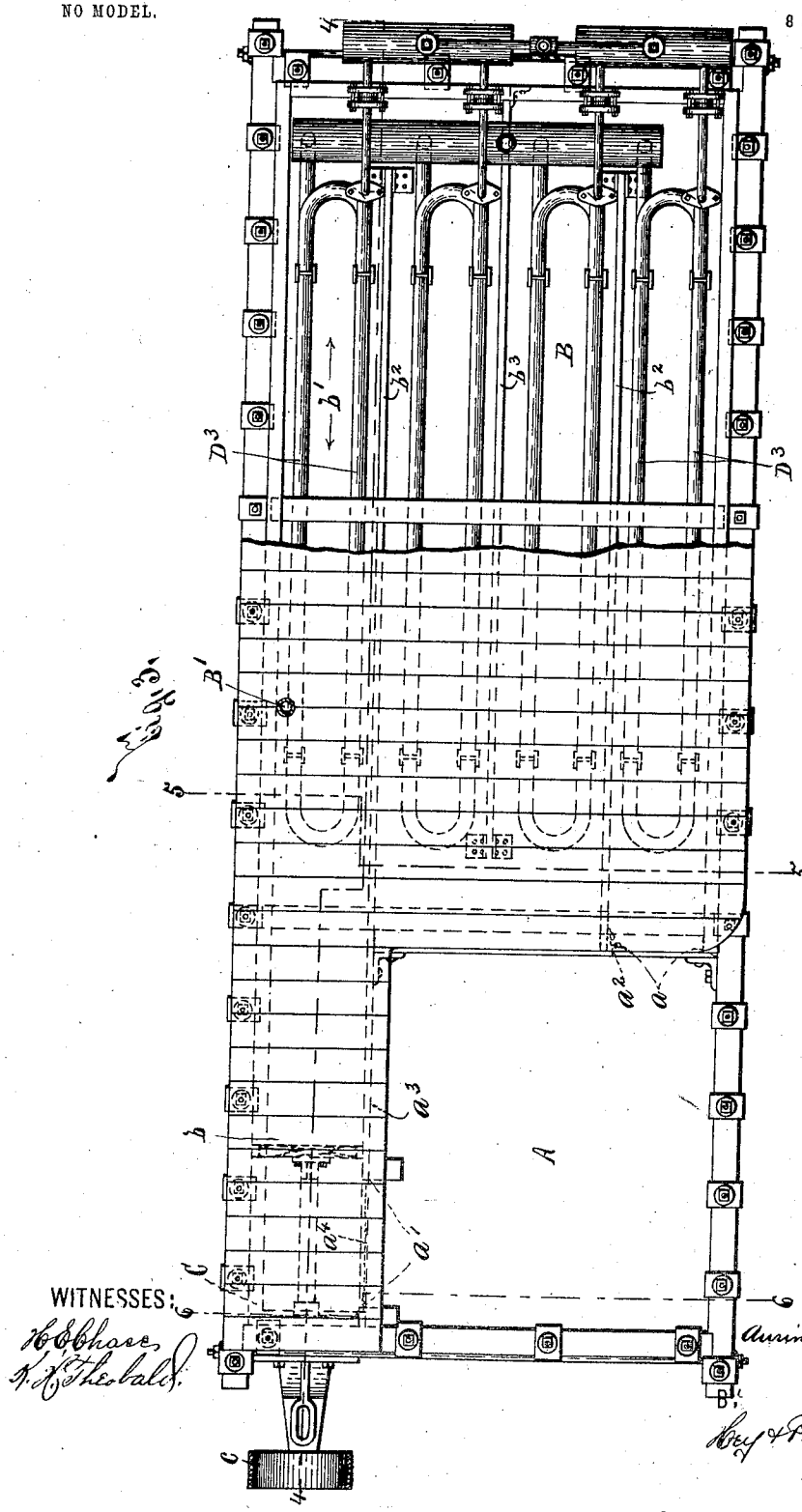
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NO MODEL. 8 SHEETS—SHEET 3.



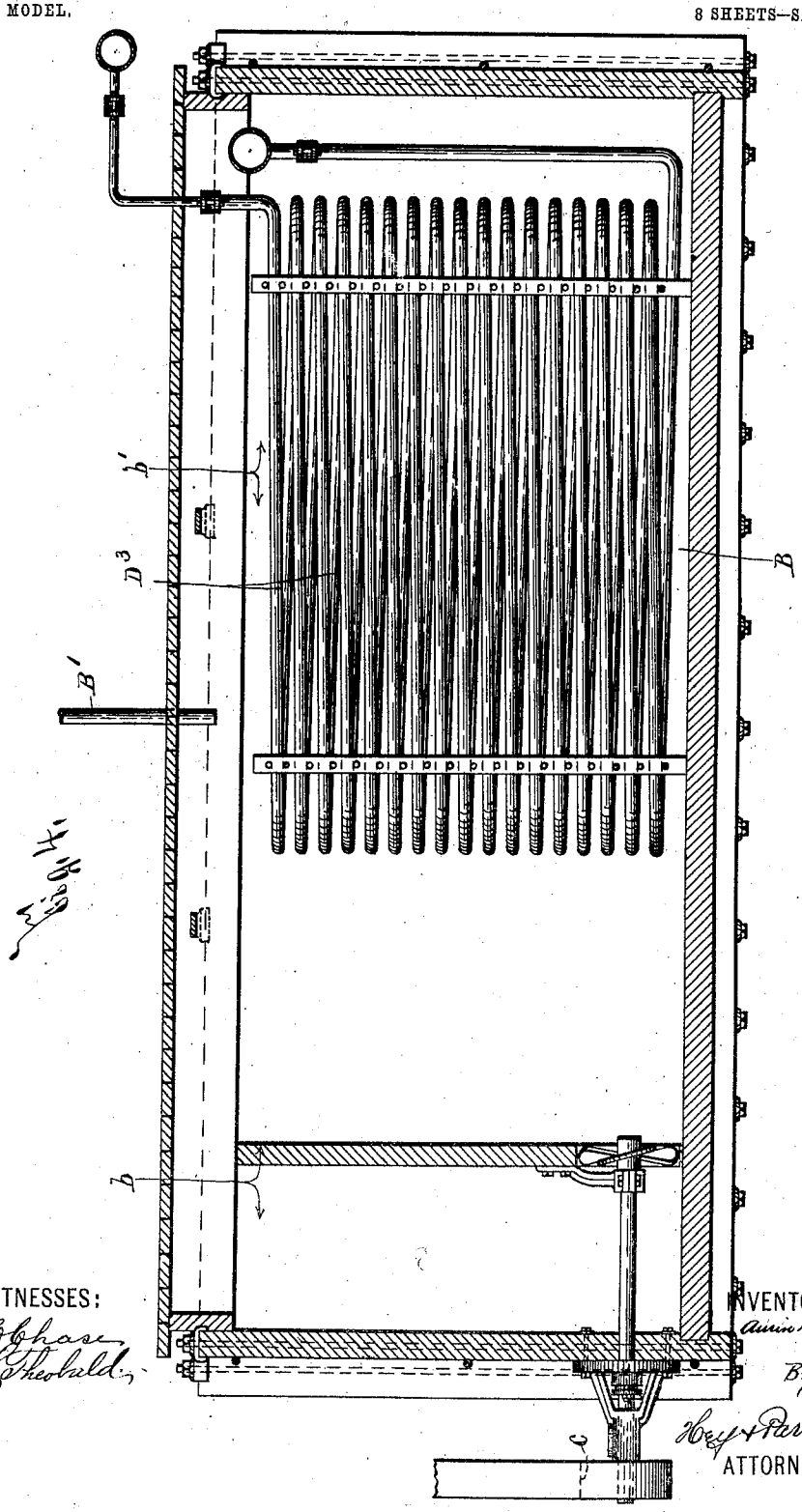
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A. M. CHASE.

TEMPERING APPARATUS.

APPLICATION FILED MAR. 7, 1899.

NO MODEL. 8 SHEETS—SHEET 4.



WITNESSES:

H. B. Chase

F. F. Theobald

INVENTOR

Amos M. Chase

By

Key + Parsons

ATTORNEYS

No. 737,079. PATENTED AUG. 25, 1903.

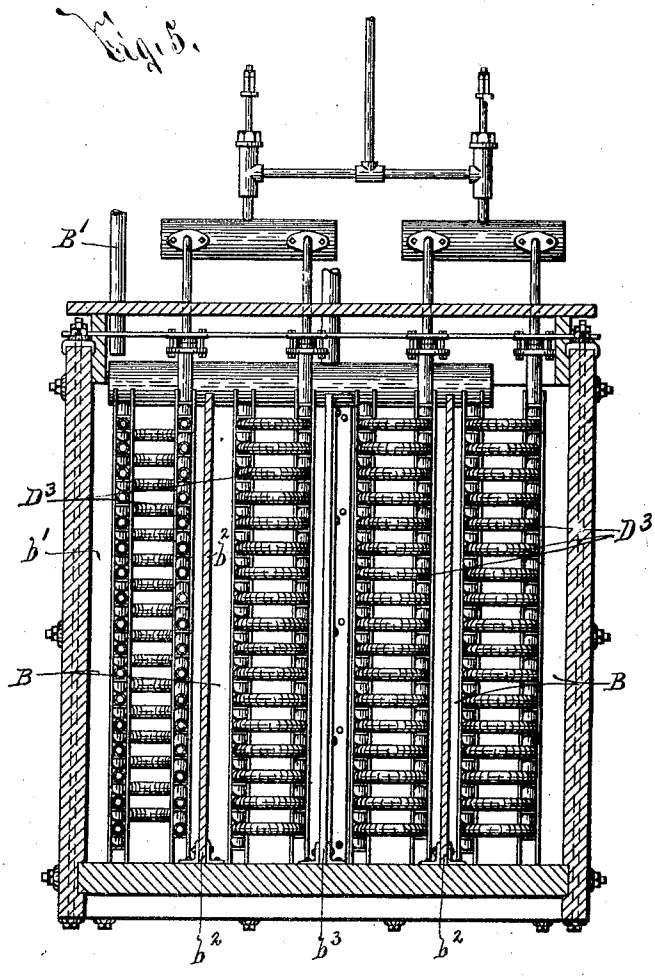
A. M. CHASE.

TEMPERING APPARATUS.

APPLICATION FILED MAR. 7, 1899.

NO MODEL 8 SHEETS—SHEET 5.

Fig. 5.



WITNESSES:

H. C. Chase

F. H. Theobald.

INVENTOR

Amin M. Chase.

B.

Key & Parsons

ATTORNEYS

No. 737,079. PATENTED AUG. 25, 1903.

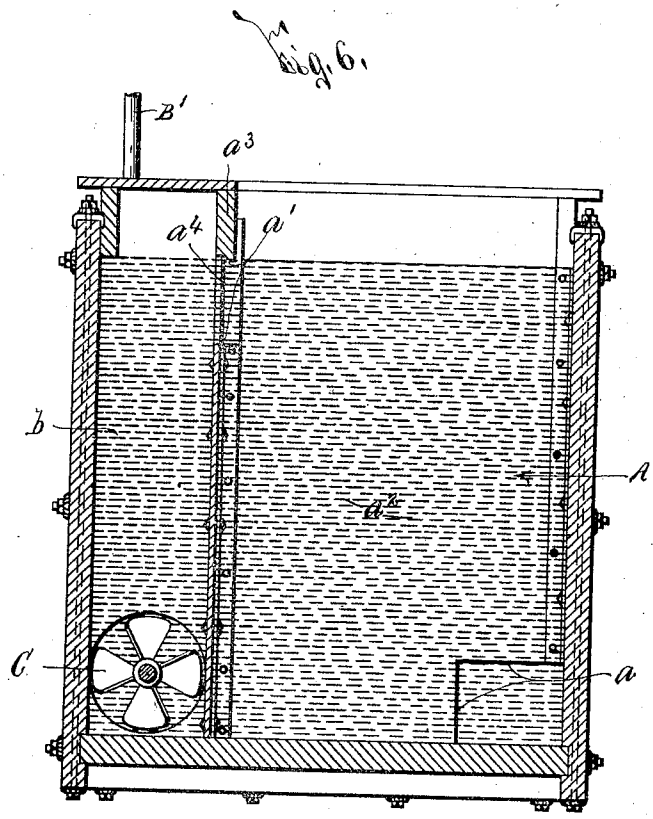
A. M. CHASE.

TEMPERING APPARATUS.

APPLICATION FILED MAR. 7, 1899.

NO MODEL. 8 SHEETS—SHEET 6.

Fig. 6.



WITNESSES:

H. G. Chase

F. L. Theobald.

INVENTOR

Aurin M. Chase.

BY

Keep & Parsons.

ATTORNEYS

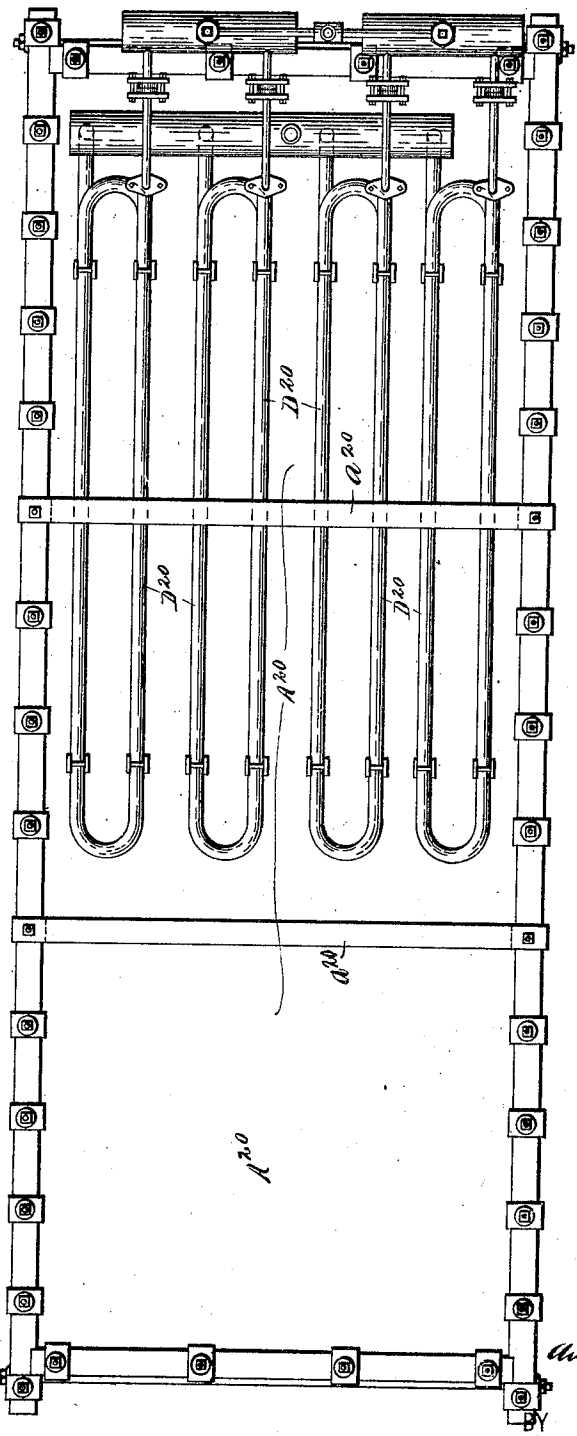
No. 737,079. PATENTED AUG. 25, 1903.

A. M. CHASE.

TEMPERING APPARATUS.

APPLICATION FILED MAR. 7, 1899.

NO MODEL. 8 SHEETS—SHEET 7.



WITNESSES:

H. C. Chase,

S. E. Theobald.

INVENTOR

Aaron M. Chase,

BY

Key & Parsons.

ATTORNEYS

No. 737,079. PATENTED AUG. 25, 1903.

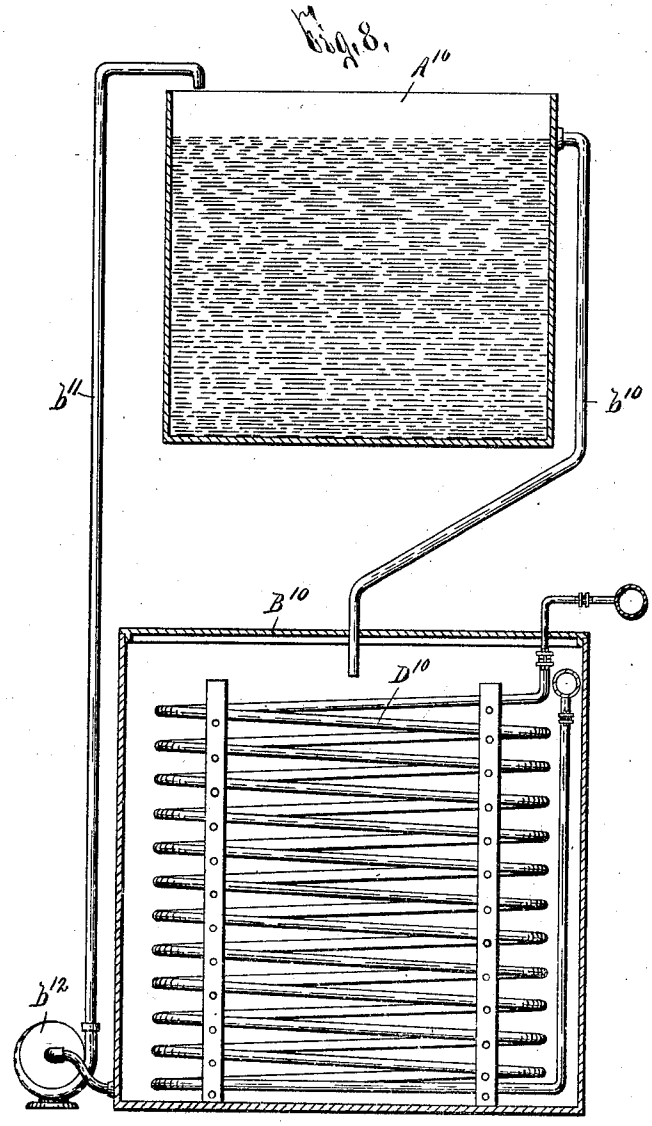
A. M. CHASE.

TEMPERING APPARATUS.

APPLICATION FILED MAR. 7, 1899.

NO MODEL. 8 SHEETS—SHEET 8.

Fig. 8.



WITNESSES:

H. E. Chase

F. H. Newbold.

INVENTOR

Amin M. Chase.

BY

Keyes & Parsons.

ATTORNEYS

No. 737,079. Patented August 25, 1903.

UNITED STATES PATENT OFFICE.

AURIN M. CHASE, OF SYRACUSE, NEW YORK.

TEMPERING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 737,079, dated August 25, 1903.

Application filed March 7, 1899. Serial No. 708,071. (No model.)

To all whom it may concern:

Be it known that I, AURIN M. CHASE, of Syracuse, in the county of Onondaga, in the State of New York, have invented a new and useful Tempering Apparatus, of which the following is a specification.

My invention has for its object the production of a tempering apparatus which requires a minimum amount of space and enables the user to temper with great uniformity; and to this end it consists in the combination, construction, and arrangement of the component parts of a tempering apparatus, as hereinafter fully described, and pointed out in the claims.

In describing this invention reference is had to the accompanying drawings, forming part of this specification, in which like letters indicate corresponding parts in all the views.

Figure 1 is a top plan view of my tempering apparatus. Fig. 2 is an isometric view of the detached receptacle for the tempering fluid. Fig. 3 is a top plan view, partly broken away, of said receptacle. Figs. 4, 5, and 6 are vertical sectional views taken, respectively, on lines 4 4, 5 5, and 6 6, Fig. 3. Fig. 7 is a top plan view of a modified construction of receptacle for the tempering fluid. Fig. 8 is a vertical sectional view of a modified construction of my invention.

It is well known to those skilled in the art that it is exceedingly difficult even for workmen of the greatest skill and expertness to secure uniform results in successively tempering a number of articles, for the reason that the fluid in which the articles are inserted when being tempered absorbs heat from said articles and is gradually heated, thus necessitating heating of most of the articles to variable temperatures and to higher temperatures than would be required if the temperature of the tempering fluid remained substantially constant. Indeed the securement of uniform results in tempering is so difficult that in practice a considerable portion of a number of articles successively tempered by even expert and skilled laborers must be retempered, thus necessitating reheating of the metal and additional labor and expense and causing the metal to become less suitable for the desired purpose. It is also well known that with a view of securing uniform results in tempering and requiring less heating of the articles to be tempered it is customary to place ice within the tempering fluid and to also employ a number of tanks or other receptacles for said fluid. When ice is used, the composition of the tempering-fluid is continually varied as the ice melts and uniformity in tempering results. Moreover, if ice is used, even in large quantities, the temperature remains constant only for a comparatively short time. The use of a plurality of tanks or receptacles containing tempering fluid also fails to aid materially in effecting uniform tempering, since the temperature of the fluid in the respective tanks or receptacles is more or less variable and rises quickly as soon as tempering is commenced. Moreover, considerable space is occupied by the various tanks or receptacles, and the means for supporting the articles to be tempered must be capable of use at several points, or means must be provided for conducting the tempering fluid from one tank or receptacle to another, which would not be necessary were a single tank or receptacle sufficient.

My apparatus is of such construction that but one tank or receptacle for receiving the articles to be tempered is required, and the tempering fluid is maintained substantially uniform in composition and temperature.

My tempering apparatus preferably consists of a receptacle for receiving the tempering fluid and the article to be tempered and a refrigerating mechanism provided with a conduit arranged in the receptacle and means for passing a refrigerating fluid through the conduit. Said receptacle may consist of a single chamber, but as usually constructed is composed of chambers A B, arranged side by side and communicating with each other in any suitable manner for permitting the circulation of the tempering fluid from one chamber to the other. The chamber A is open at its top for admitting the article to be tempered and is provided with inlet and outlet openings a a'. Said inlet-opening a is generally formed in the lower portion of the side a^2, adjacent to the chamber B, and the outlet-opening a' is usually formed in the upper portion of one of the

sides a^3, arranged at an angle with the side a^2, and is provided with a screen a^4 for preventing the escape of scale and other materials. The chamber B serves to cool the heated tempering fluid and is preferably provided with an inlet-conduit B′ for the tempering fluid, a lateral branch b, and a tortuous passage b', communicating at one end with the branch b and at its opposite end with the inlet-opening a of the chamber A. Said branch b extends along the side a^3 of the chamber A, provided with the outlet-opening a' and communicates with said opening. The passage b' may be formed by any suitable means and is here illustrated as inclosed by a series of partitions b^2, extending from one wall of the chamber B toward the opposite wall of said chamber, and an additional partition b^3, alternating with the partitions b^2 and extending from said opposite wall of the chamber B toward the wall of said chamber from which the partitions b^2 project.

I usually provide my tempering apparatus with a suitable device, as a revoluble propeller-wheel C, for effecting a positive circulation of the tempering fluid from the outlet-opening a' through the branch b and the passage b' to the inlet-opening a. This propeller-wheel C is generally arranged in the branch b in an opening in a crosswise partition in said branch and is revolved by any suitable means, as a pulley c, arranged at the exterior of the branch b. The circulation of the tempering fluid between the chamber for receiving the article to be tempered and the chamber for cooling the heated tempering fluid may obviously be effected by any other suitable means, as illustrated in Fig. 8, in which figure I have shown a chamber A^{10} for receiving the article to be tempered, a chamber B^{10}, arranged beneath the chamber A^{10} for receiving the heated tempering fluid, refrigerating-conduits D^{10}, similar to the conduits D^3, presently described, conduits b^{10} b^{11}, opening, respectively, from the chambers A^{10} B^{10}, and discharging, respectively, into the chambers B^{10} A^{10}, and a pump b^{12} for effecting the passage of the cooled tempering fluid from the chamber B^{10}.

The refrigerating mechanism of my tempering apparatus may be of any desirable form, size, and construction and is here shown as consisting of a compressor or pump D, a condenser D′, a receiver D^2, expansion refrigerating-conduits D^3, and suitable connections between the compressor or pump, condenser, receiver, and conduits for circulating an expansible refrigerating fluid through said conduits. The construction of the compressor or pump D, condenser D′, receiver D^2, and the connections between said parts forms no feature of my present invention, and consequently it is unnecessary to describe the same. Said conduits D^3 are preferably arranged in the path of the tempering fluid in the chamber B, being here shown as supported within the branches of the tortuous passage b', as best seen in Fig. 3. The refrigerating-conduits of the refrigerating mechanism of my tempering apparatus may, however, be otherwise arranged, as seen in Fig. 7, in which figure I have shown refrigerating-conduits D^{20} in one end of a chamber A^{20}, which receives the tempering fluid and is provided with cross-bars a^{20}, connecting the upper portions of its longitudinal sides.

It will be noted that my apparatus provides an open unobstructed tempering-pool in open communication with the tempering fluid and that the conduit for the refrigerating medium is located wholly without said pool.

In the operation of my tempering apparatus the refrigerating mechanism constantly or intermittently maintains a lower temperature within the refrigerating-conduits than that of the fluid circulating around said conduits. The temperature of said fluid is thus reduced, and, if desired, ice is formed upon the exterior of the refrigerating-conduits. The cooled tempering fluid is admitted to the lower portion of the chamber for receiving the article to be tempered and is withdrawn from the top of said chamber and again passed through the chamber containing the refrigerating-conduits. The tempering fluid within the chamber for receiving the article to be tempered may thus be maintained at any desired temperature, and consequently the user of my apparatus may temper uniformly.

The construction and operation of my invention will now be readily understood upon reference to the foregoing description and the accompanying drawings, and it will be particularly noted that my invention is not limited to any exact construction of refrigerating mechanism.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In an apparatus for tempering metallic articles, the combination of a receptacle for receiving the tempering fluid, a tempering-pool in open communication with the fluid in said receptacle, an expansion refrigerating-conduit within the receptacle, and means for circulating an expansible refrigerating fluid through said conduit, substantially as and for the purpose described.

2. In an apparatus for tempering metallic articles, the combination of an open unobstructed chamber for receiving the tempering fluid and the article to be tempered, a second chamber communicating with the first chamber for supplying the tempering fluid thereto, whereby a tempering-pool is provided within the receptacle, an expansion refrigerating-conduit within the second chamber, and means for circulating an expansible refrigerating fluid through said conduit, substantially as and for the purpose specified.

3. In an apparatus for tempering metallic articles, the combination of a chamber for receiving the tempering fluid and the article to be tempered, a second chamber communi-

cating with the first chamber for supplying the tempering fluid thereto, means for circulating said fluid, an expansion conduit within the second chamber, and means for circulating an expansible refrigerating fluid through said conduit, substantially as and for the purpose set forth.

4. The combination of a chamber for receiving the tempering fluid and the article to be tempered, a second chamber communicating with the first chamber for supplying the tempering fluid thereto, a screen for preventing the escape of scale from the first chamber to the second chamber, an expansion refrigerating-conduit within the second chamber, and means for circulating an expansible refrigerating fluid through said conduit, substantially as and for the purpose described.

5. In an apparatus for tempering metallic articles, the combination of a chamber for receiving the tempering fluid and the article to be tempered, a second chamber for supplying the tempering fluid to the first chamber, means for causing a circulation of said fluid, said second chamber being arranged at one side of the first chamber and having its side nearest to the first chamber connected to the adjacent side of said first chamber and provided with a lateral branch extending along the first chamber and connected to the contiguous side thereof, said first-named chamber providing an unobstructed pool for the reception of the article to be tempered, an expansion refrigerating-conduit within the second chamber, and means for circulating an expansible refrigerating fluid through said conduit, substantially as and for the purpose specified.

6. In an apparatus for tempering metallic articles, in combination, a tempering-pool, a circulating medium for maintaining said pool, and a refrigerating mechanism provided with a conduit arranged in the body of said circulating medium, said conduit being located wholly without said pool, substantially as described.

7. In an apparatus for tempering metallic articles, the combination of a tempering-pool, for receiving the articles, provided by one chamber, a second chamber in open communication with the first chamber for supplying the tempering fluid thereto, said second chamber being provided with a tortuous passage for the tempering fluid, expansion refrigerating-conduits arranged in the branches of the tortuous passage of the second chamber, and means for circulating an expansible refrigerating fluid through said conduit, substantially as and for the purpose described.

8. The combination of a chamber for receiving the tempering fluid and the article to be tempered, a second chamber communicating with the first chamber for supplying the tempering fluid thereto, said second chamber being provided with partitions extending from one wall thereof toward its opposite wall, an additional partition alternating with the first partitions and extending from said opposite wall toward the first wall, said partitions forming a tortuous passage for the tempering fluid, expansion refrigerating-conduits arranged between the partitions of the second chamber, and means for circulating an expansible refrigerating fluid through said conduits, substantially as and for the purpose specified.

9. The combination of a chamber for receiving the tempering fluid and the article to be tempered, a second chamber communicating with the first chamber for supplying the tempering fluid thereto, means for causing the circulation of said fluid, an expansion refrigerating-conduit within the second chamber, and means for maintaining a coating of ice on the outer surface of said conduit during the use of the first chamber, substantially as and for the purpose specified.

In testimony whereof I have hereunto signed my name, in the presence of two attesting witnesses, at Boston, in the county of Suffolk, in the State of Massachusetts, this 6th day of January, 1899.

AURIN M. CHASE.

Witnesses:
ALPHEUS SANFORD,
MARTIN J. GILMARTIN.