No. 669,250. Patented Mar. 5, 1901.

R. BIRKHOLZ.

STEAMING TANK.

(Application filed Aug. 3, 1900.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

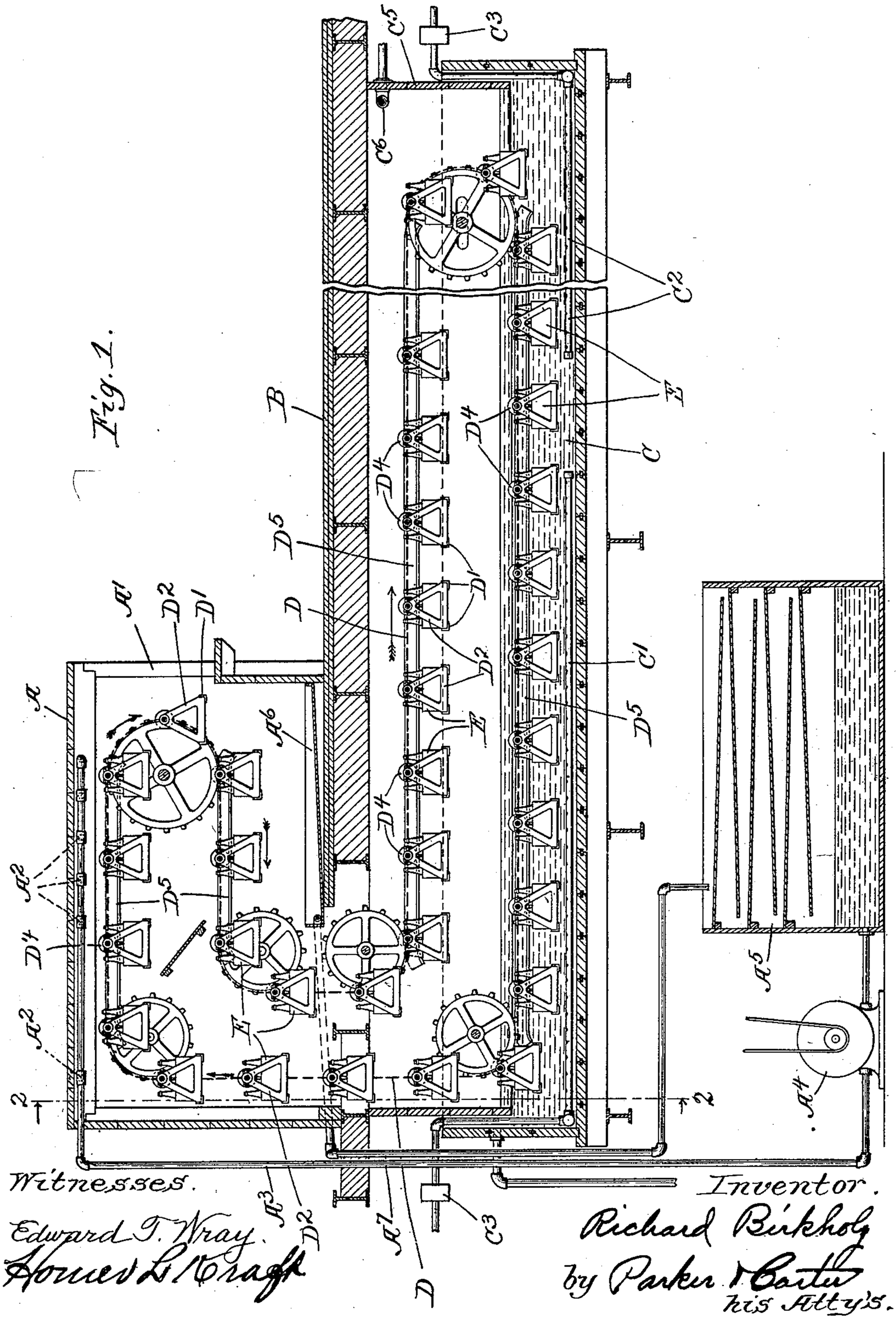

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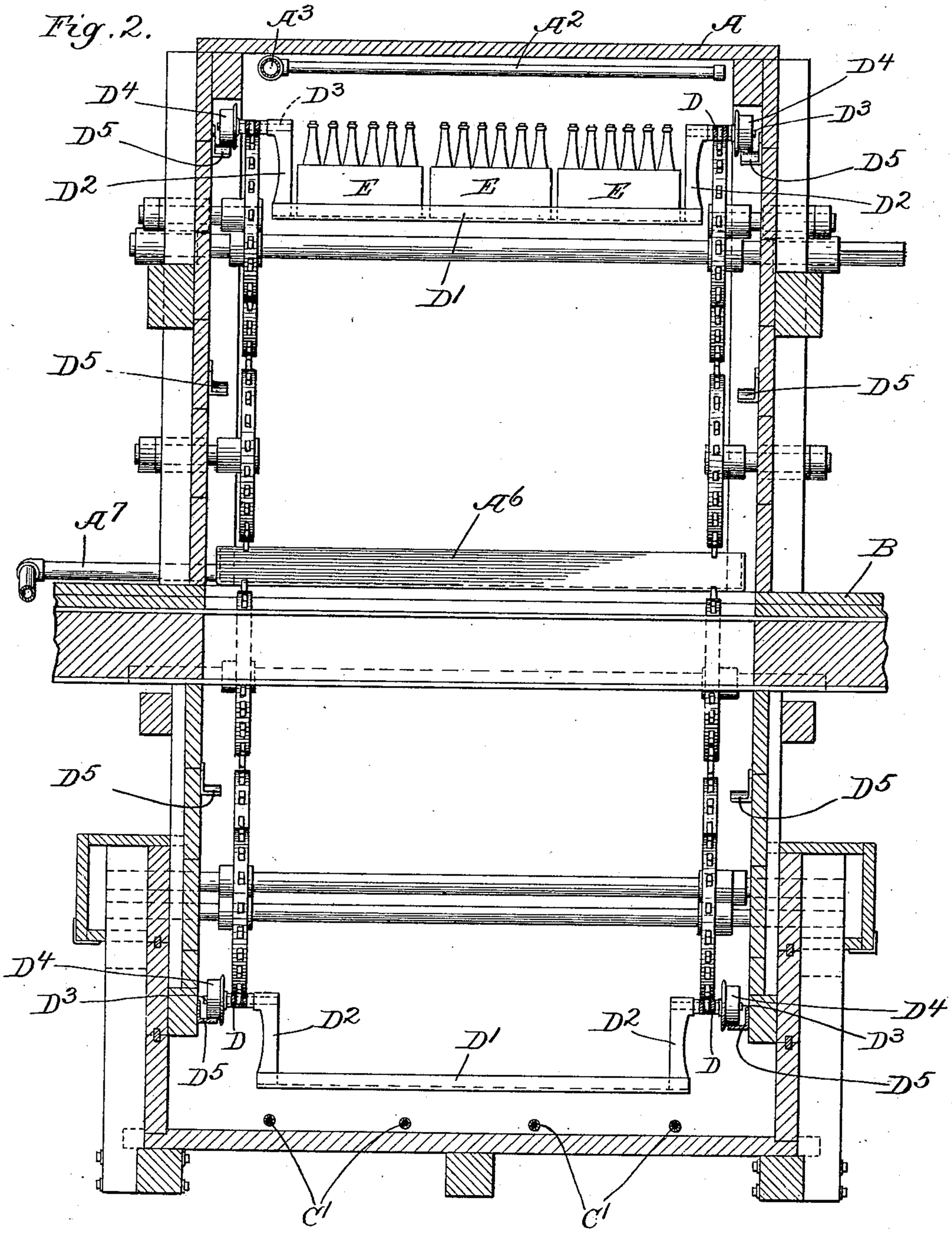
Fig. 2.



Witnesses.

Edward T. Wray.

Howard L. Craft.

Inventor.

Richard Birkholz

by Parker & Carter

his Atty's.

UNITED STATES PATENT OFFICE.

RICHARD BIRKHOLZ, OF MILWAUKEE, WISCONSIN, ASSIGNOR TO THE LINK BELT MACHINERY COMPANY, OF CHICAGO, ILLINOIS.

STEAMING-TANK.

SPECIFICATION forming part of Letters Patent No. 669,250, dated March 5, 1901.

Application filed August 3, 1900. Serial No. 25,791. (No model.)

To all whom it may concern:

Be it known that I, RICHARD BIRKHOLZ, a citizen of the United States, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented a certain new and useful Improvement in Steaming-Tanks, of which the following is a specification.

My invention relates to steaming-tanks, and has for its object to provide a new and improved tank adapted to be used for heating or treating by varying temperatures jars, cans, bottles, or the like containing perishable material of any description.

My invention is illustrated in the accompanying drawings, wherein—

Figure 1 is a longitudinal section through a device embodying my invention. Fig. 2 is a section on line 2 2, Fig. 1.

Like letters refer to like parts throughout both figures.

In the ordinary process of treating substances which are to be placed in glass bottles or cans the practice is to can or inclose the substance in a bottle when it is at a comparatively high temperature; but it is found necessary to secure the best results to subsequently reheat the bottle and contents, and this is effected by passing the same into successively-increasing temperatures and then cooling it sufficiently to permit of its being handled, the temperature at some stage of the process being quite considerable. There are a series of difficulties which are likely to arise in connection with the carrying out of this process. In the first place, the process is necessarily comparatively slow, and therefore requires for operation on a large scale a very considerable floor-space, or, in other words, a large plant. Again, the bottles while passing from one temperature to another are very likely to be broken, and this breakage is liable to take place at various points along the line of travel; but the broken parts should be removed, for otherwise they endanger the other bottles. Again, when broken the contents of course immediately are incorporated with the contents of the heating-tank, and in a short time odors and gases arise which are injurious, and mixed with escaping steam or vapor tend to render the apartment in which the process has taken place unfit for occupants. For these reasons the tank should be inclosed as far as possible. Again, the bottles or glass jars are commonly thick at the bottom, and it is desirable to subject them to the heating process in its early stages in such a way as to provide for this thickened bottom or to subject it to a non-dangerous but slightly higher degree of heat than the rest of the bottle, thus minimizing the danger of breakage by making the effective heat applied variable in proportion to the thickness of the bottle.

In order to accomplish the general result desired, together with the specific features of that result above referred to, I provide, broadly speaking, an apparatus which consists of a continuously-operating endless chain, which is utilized continuously throughout its entire length, a tank in which the same moves and which is practically closed to the chamber or room in which the apparatus is located and which has compartments, water and steam supply connections, and means for conducting the conveyer-belt, so that the bottles or cans or jars are successively presented to a spray of warming-water, a bath of heated vapor, water of increasing temperature, and a cooling-spray. Moreover, the arrangement is such that while the bottles are passing through the heated vapor the bottoms are exposed to additional or radiant heat, or, in other words, to heat in addition to that of the vapor, and therefore in excess of the heat applied to other portions of the bottles or jars. The bottles or jars are carried in groups in baskets or cages, so that if broken the parts will be carried around and can be taken out by the person in charge of the machine.

Referring now to the drawings, I have shown one construction embodying my invention. This construction consists of a box A, placed above the working floor B, and a tank C, placed below the working floor B. An endless chain or other power-transmitting device D passes over suitable sprocket-wheels or pulleys in the parts A and C, said chain passing up through the working floor B, as shown in Fig. 1. This chain is driven by any suitable agency. As herein illustrated, the chain

consists of two parts, one on each side of the device, as shown in Fig. 2. A series of platforms or trays D′ are suspended between the parts of the chain, as shown in Fig. 2. These platforms or trays are preferably supported, not by the chain, but by some other agency. As herein shown, the trays are provided with the end pieces D^2, carrying the shafts D^3. These shafts are provided with the wheels D^4, which engage the supports or rails D^5. The chain is attached to these shafts between the wheels and the end pieces D^2. The trays or platforms may be of any desired shape and are adapted to receive the cans, jars, bottles, or the like in which the material is contained. The box or part A is provided with the charging-opening A′, as shown in Fig. 1, and the material to be treated is placed upon the trays at this point. It will thus be seen that when the chain is set in motion each tray or platform will be carried completely around the device and back to the starting-point, where the material may be removed. The part A is provided with a suitable means for spraying water upon the material as the trays pass through this part. Any suitable means for this purpose may be used. As herein shown, I provide a series of perforated pipes A^2, which are connected by a pipe A^3 with a pump A^4 and a reservoir A^5. The bottom of the upper part A is provided with a pan A^6 or other device for collecting the water after it has been sprayed upon the devices to be treated, and this pan is connected by a pipe A^7 with the reservoir A^5. It will be seen that by this means the same water may be used continuously. The tank C is partly filled with water, the water being deep enough to completely cover the jars or other devices placed upon the platforms. At the bottom of the tank are placed two series of steam-pipes C′ and C^2, connected with some source of steam-supply, so as to heat the water in the tank. I prefer to have one set of pipes arranged or controlled so that the water at that end will be heated to a higher degree than the water at the other end, thus producing a tank of hot water varying in temperature from one end to the other. These steam-pipes are controlled automatically, so as to keep the water at a certain temperature. This may be done in any desired manner—as, for example, by providing the valves C^3 with an automatic thermostatic controlling device. Instead of making the tank C in one part I may make it in two parts, as shown in Fig. 1, by providing the part or projection C^5, which extends up to the ceiling below the working floor B and also extends partly into the water in the tank, so as to make a water seal. A second set of steam-pipes C^6 enter the tank above the water and are perforated, so as to permit steam to escape into the tank. These steam-pipes should be provided with suitable valves, so that the amount of steam in the upper part of the tank can be properly controlled. The upper part of the tank C is also heated by the heat radiating from the hot water. This surface of hot water is hotter than the space above it and forms a heated wall for such space or "vapor-chamber," as I have sometimes called it. When the bottles, jars, or other receptacles for the material to be treated are made of glass, it often happens that they break when the material is subjected to heat. I therefore prefer to have the platforms D′ adapted to receive these receptacles when in the boxes E, in which they are handled while in the factory, the boxes being placed upon the platforms, as shown in Fig. 2. In this event if the receptacles become broken the parts are not permitted to fall into the tank, so as to obstruct the free passage of the following platforms, but are held in the box, so that they can be removed at the charging-opening. In many instances the material in the receptacles when they become broken falls into the tank and contaminates the water, so that it corrodes and injures the metal of the chain. In order to avoid this as much as possible, I prefer to use a malleable chain with a natural black coating of iron oxid and to provide suitable removable bushings for the wearing parts, which can be removed when corroded and replaced by others. This insures a long life of the chain.

I may further explain that by such an apparatus the heat-vapors which arise from the water are conserved and made to do duty by first heating the jars before they are put into the water. My apparatus therefore presents the double economy of reusing the water itself and of at the same time using the heat of the escaping or rising vapors. The heating effect of the vapor-bath is less than that of the hot-water bath, and the steam-supply is so regulated that the water at the end of the water-bath where the bottles are first put in is not so hot as it is at the other end. It is my purpose to locate the greater portion of the heating-tank or the lower body thereof below the floor of the room, and thus a great saving in space will be made as compared with an open tank. The heat radiating directly from the surface of the hot water is directed against the thickened bottoms of the jars, though of course, as my general explanation indicates, the spirit of this portion of my device could be embodied in a different form, but so as to give the bottom of the bottles more heat than that applied to other portions for the purpose of minimizing the danger of breakage.

The tank A^5 may be placed in any desired position and even on the roof of the building and may be supplied with partitions or shelves, as indicated diagrammatically, to serve further to cool the water.

I have described in detail a particular construction embodying my invention; but it is of course evident that the parts may be greatly varied in form, construction, and arrangement and that some of the parts may be omitted and others used with parts not herein shown without departing from the spirit of

my invention. I therefore do not limit myself to the construction shown.

Generally speaking, the object of my invention is to gradually bring the bottles and their contents to a greater heat, while avoiding to a great degree the breakage of the bottles and by means of an apparatus which occupies the least possible space and utilizes to the greatest possible degree the heat and water required.

The use and operation of my invention are as follows: When the water in the tank is properly heated, the chain is set in motion in the direction indicated by the arrow and the jars, bottles, cans, or other receptacles contained in the boxes E are placed upon the platforms at the charging-opening A′. (See Fig. 1.) These receptacles are then moved backward in the part or box A, and the more or less cold water or spray from the pipes A^2 falls upon them. The platforms then pass down through the working floor B, and the receptacles become enveloped in the steam in the upper part of the tank C. As these receptacles are cold, they condense a portion the steam and take up its heat, thus gradually becoming heated as they pass along the upper part of the tank. The platforms are preferably made of iron, and in this event they also take up the heat and conduct it to the receptacles. The radiating heat of the hot water is also more or less absorbed by the receptacles in their passage through the upper part of the tank. When the receptacles reach the end of the tank, they are submerged in the warm water and are thus further heated. I prefer to have the steam-pipes regulated so that the water heated by the pipes C^2 will not be as warm as the water heated by the pipes C′, and hence as the receptacles move along through the water they pass successively into an area of higher temperature until they are moved out of the water at the end of the tank. The temperature of the water will of course be regulated to correspond to the result desired and the material treated, and it will be seen that the tank can be so arranged as to gradually heat up the receptacles, said receptacles being moved successively into varying temperatures due to the variable temperature of the water. When the platforms pass out of the water, they pass up through the floor and beneath the pipes A^2 in the upper part or box A and are sprayed with the cold water passing therefrom, so that they will be properly cooled when they reach the opening A′, where they are to be removed. I prefer to arrange the device as shown, so that the water from the pipes A^2 first comes into contact with the hot receptacles and then comes into contact with the cold receptacles, and this is so because the heated bottles first receive this water and it then trickles down upon the incoming cold bottles. Under these conditions the cold water absorbs the heat from the hot receptacles and the heat is then abstracted by contact with the cold receptacles. The water then falls into the pan and passes down into the tank and is again pumped to the pipes A′. This arrangement permits the water to be used continuously and prevents the water from becoming overheated. It will be seen that by this construction the chain is made use of throughout its entire length. The receptacles are first partially heated by the relatively cold water in the upper part A. They are then gradually brought to a higher temperature by the steam in the tank C and then by the hot water in said tank. They then pass up into the upper part and are there cooled, so as to be ready for removal when they reach the opening A′.

I claim—

1. An apparatus for treating perishable material, comprising a continuous inclosed tank containing water, means for heating the water so that its temperature will vary from one end toward the other, means for admitting steam into the tank above the water to create a steam-charged space, and a carrying device for receiving and moving the material along said tank successively through the steam-space and the water-space.

2. An apparatus for treating perishable material, comprising two parts, one above the other, an endless chain carrying a series of platforms, upon which the material to be treated is carried, and movably mounted in said parts, means for heating the material when in the lower part of the apparatus, the chain in the upper part being looped so that one part is above the other, a water-spraying device in the upper part adapted to spray water so that it passes successively from one series of platforms to the other, and means for continuously using this water, substantially as described.

3. An apparatus for reheating bottles and the like, containing a hot-vapor chamber, a hot-water chamber with a free communication between the two, and means for carrying the articles to be treated successively through the hot-vapor chamber and the hot-water chamber and through such communication and without exposure to other media than such hot water and hot vapor.

4. An apparatus for reheating bottles and the like, containing a hot-vapor chamber, a hot-water chamber with a free communication between the two, and an endless conveyer adapted to carry at any part of its length the article to be treated and arranged to pass successively through the hot-vapor chamber and the hot-water chamber and through such communication and without exposure to other media than such hot water and hot vapor.

5. An apparatus for reheating bottles and the like, containing a hot-vapor chamber, a hot-water chamber with a free communication between the two, and an endless conveyer adapted to carry at any part of its length the article to be treated and arranged to pass successively through the hot-vapor

chamber and the hot-water chamber and through such communication and without exposure to other media than such hot water and hot vapor, said conveyer having a series of baskets or cages in which the bottles are carried.

6. In an apparatus for reheating bottles and the like, a hot-vapor chamber, having one of its inclosing surfaces hotter than the vapor so as to superheat by radiation from such surface that portion of an object in the vapor exposed to such surface, a carrying device to carry the bottles or the like through the hot-vapor chamber, with the thickened portions of the bottles turned toward such heating-surface, for the purpose described.

7. In an apparatus for reheating bottles and the like, the combination of a tank forming within itself an inclosed heating-chamber, consisting of an upper hot-vapor chamber or portion and a lower hot-water chamber or portion, with a conveyer adapted to carry the bottles successively through the two portions of the inclosed heating-chamber, without exposing them to other media.

8. In an apparatus for reheating bottles and the like, a tank containing an upper hot-vapor chamber, a lower hot-water chamber or space, a conveyer adapted to carry the bottles successively through the two chambers, and steam and water supplies so arranged as to keep the water at one end of the water space hotter than at the other.

9. An apparatus for reheating articles, comprising a hot-water chamber and a conveyer, with suitable supports and driving mechanism, a part of the conveyer lying along and in proximity to the surface of the hot water to receive heat from such surface and another part lying through the body of the hot water to receive heat from such water.

RICHARD BIRKHOLZ.

Witnesses:
STAUNTON B. PECK,
FRANCIS W. PARKER.