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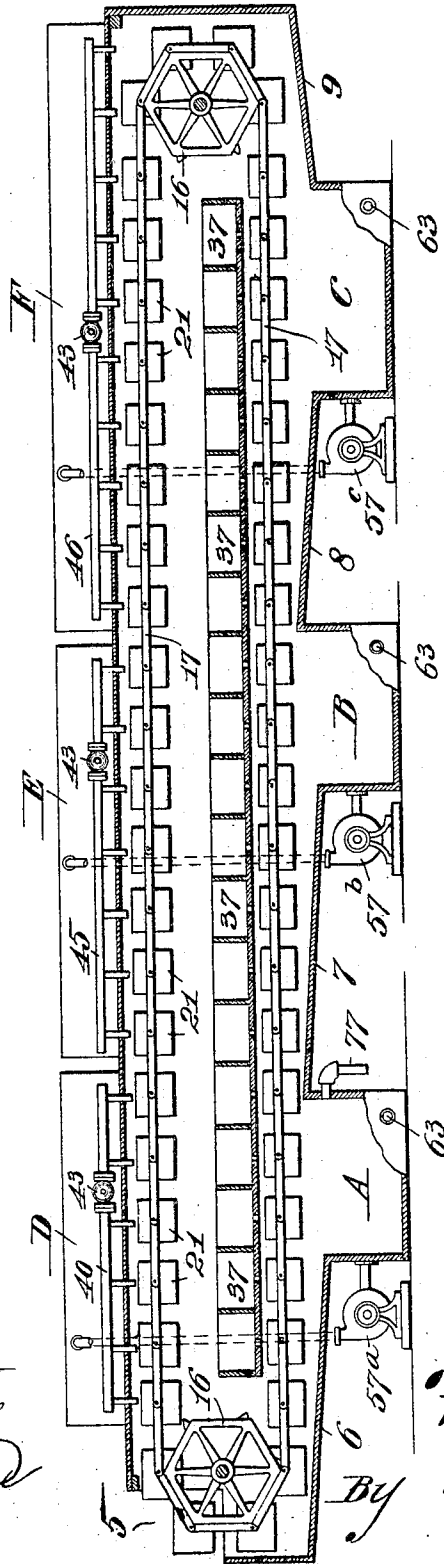
PATENTED OCT. 10, 1905.

W. J. RUFF.
PASTEURIZER.

APPLICATION FILED JAN. 30, 1905.

4 SHEETS—SHEET 1.

Fig. 1.

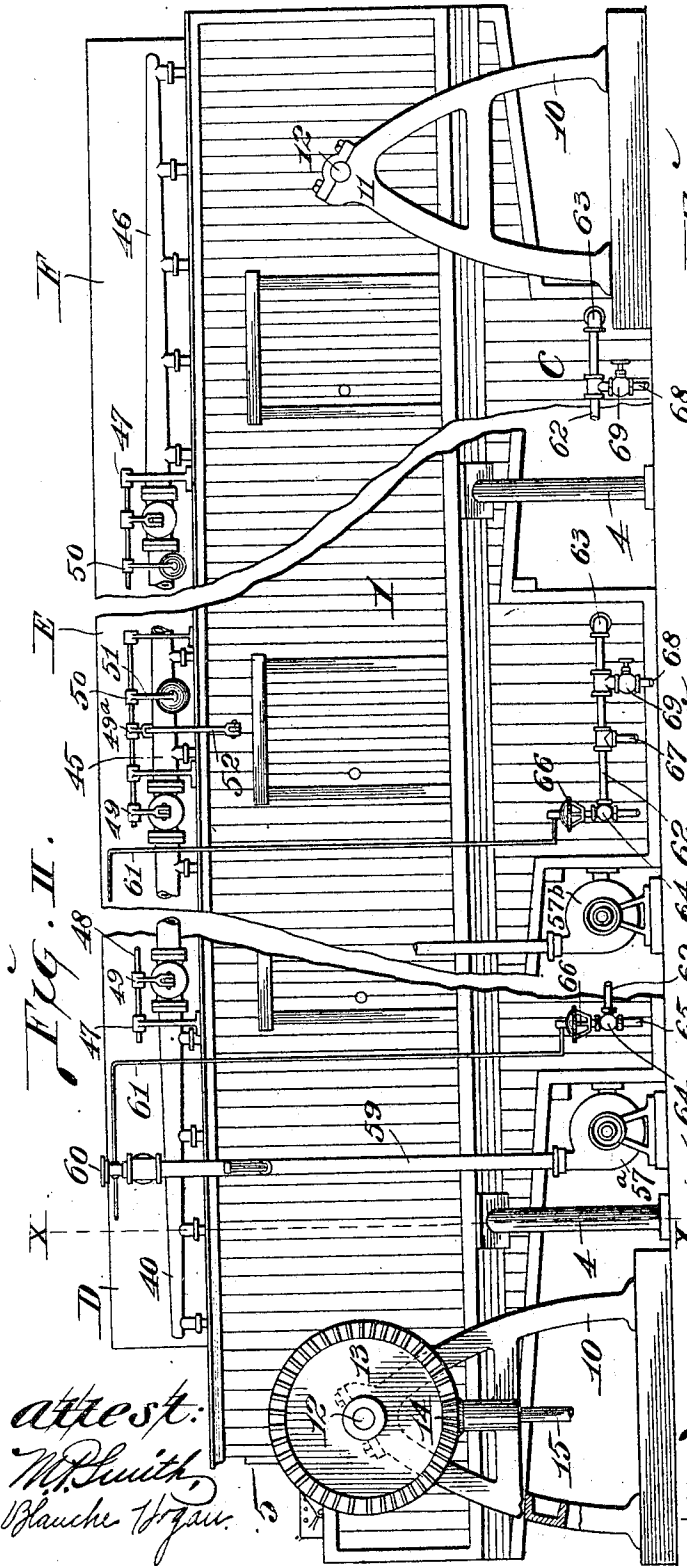


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4 SHEETS—SHEET 2.



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Fig. V.

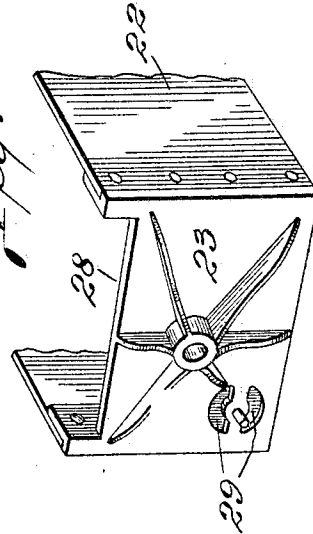


Fig. IV.

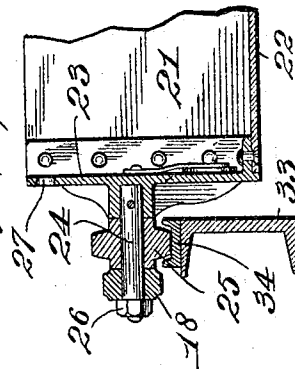
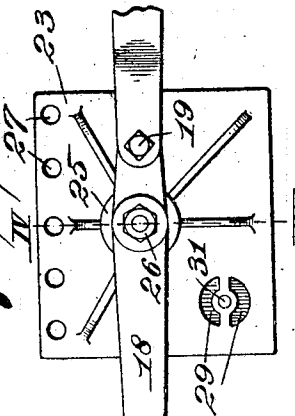


Fig. III.



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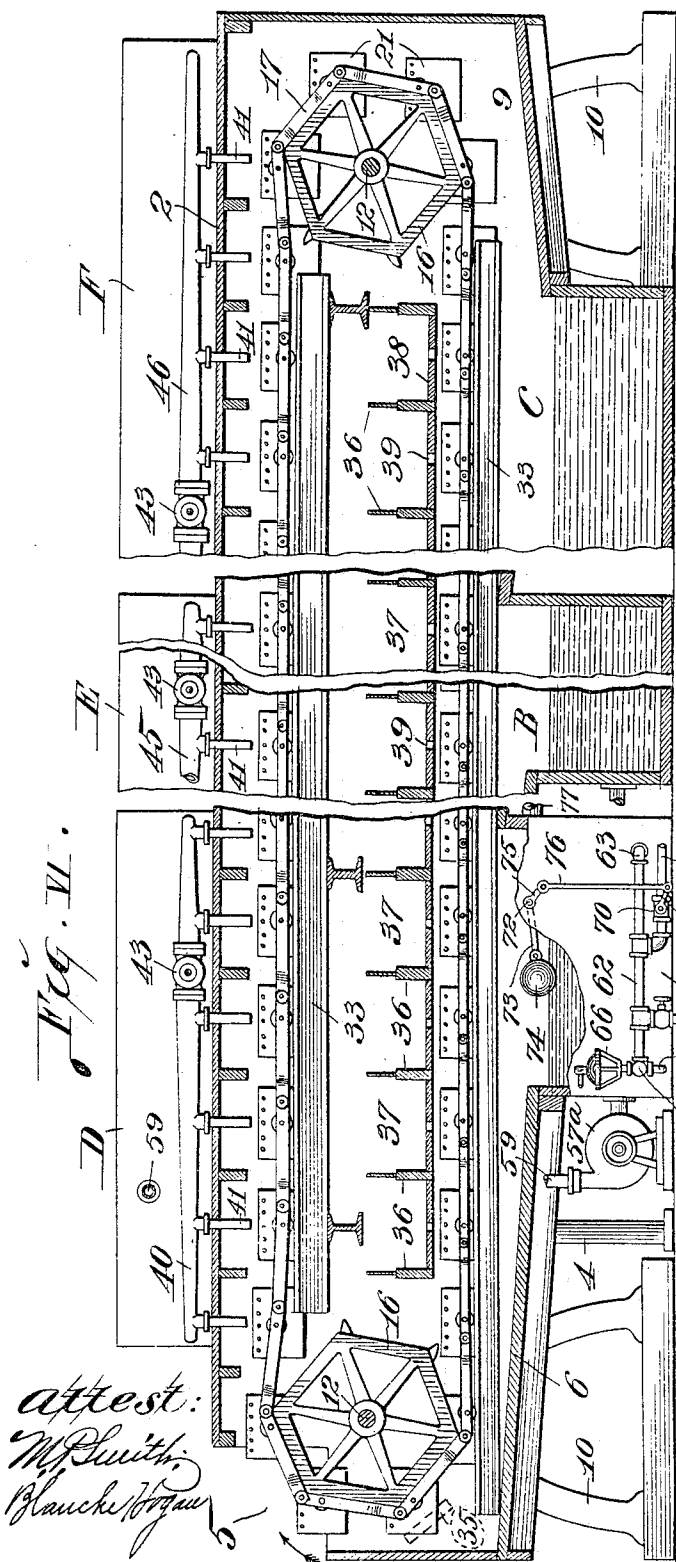
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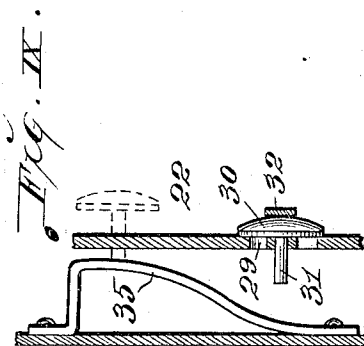
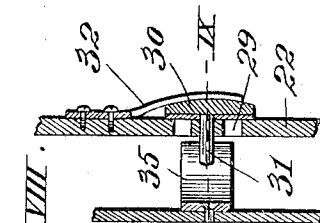
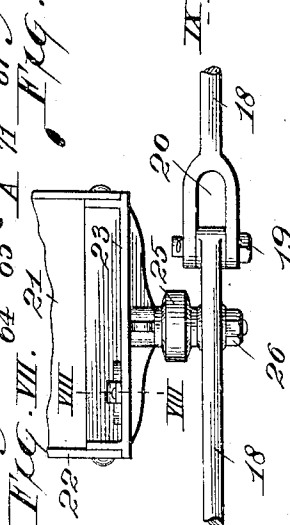
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APPLICATION FILED JAN. 30, 1905.

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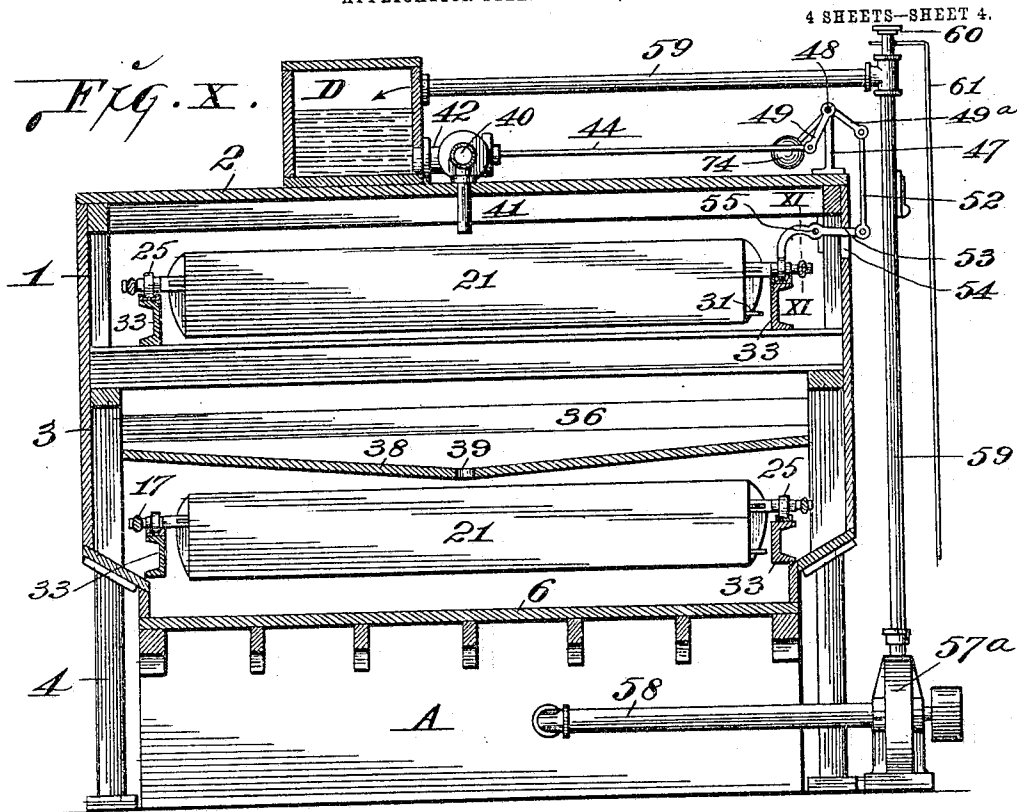
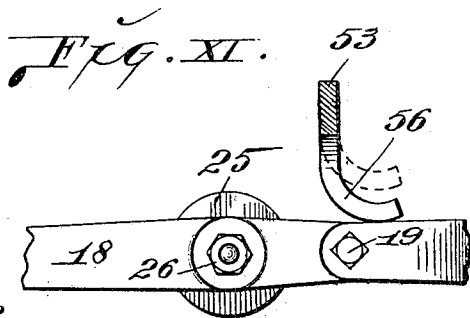
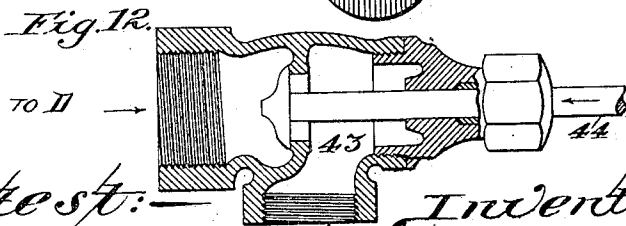


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UNITED STATES PATENT OFFICE.

WILLIAM J. RUFF, OF QUINCY, ILLINOIS.

PASTEURIZER.

No. 801,693.

Specification of Letters Patent.

Patented Oct. 10, 1905.

Application filed January 30, 1905. Serial No. 243,275.

To all whom it may concern.

Be it known that I, WILLIAM J. RUFF, a citizen of the United States, residing in Quincy, in the county of Adams and State of Illinois, have invented certain new and useful Improvements in Pasteurizers, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

The object of my invention is to provide suitable means for pasteurizing beer wherein the heating agent is applied to the beer going into the machine with a gradually-increasing temperature and which heating agent is applied to the beer as it leaves the machine with a corresponding gradual decrease of temperature.

A further object of my invention is to construct a beer-pasteurizer wherein no cooling-water is made use of, but where the lower temperature of the cold beer entering the pasteurizer is utilized to lower the temperature of the beer after it has been pasteurized and is being discharged from the machine.

My invention consists in a pair of endless chains moving in horizontal planes and carrying between them carriers adapted to receive the bottled beer, a plurality of basins or tanks arranged beneath the chains and carriers, a corresponding plurality of tanks arranged above the chains and carriers, and various connections whereby water is taken from the tanks below the carriers and delivered to the tanks above the carriers, from whence said water discharges into the carriers and finally returns to the lower tanks or basins.

Figure I is a longitudinal section taken approximately through the center of a pasteurizer of my improved construction, this view being in the nature of a diagrammatical view and illustrating principally the chains, carriers, and tanks. Fig. II is a side elevation of the pasteurizer, parts thereof being broken away. Fig. III is an end elevation of one of the carriers made use of in carrying out my invention. Fig. IV is a vertical section taken on line IV IV, Fig. III. Fig. V is a perspective view of one end of a modified form of the carrier. Fig. VI is a vertical section taken longitudinally through the center of the machine. Fig. VII is a plan view of one end of one of the carriers. Fig. VIII is a detail vertical section taken at the end of one of the carriers through the discharge-valve thereof and showing a device for automatically opening said discharge-valve. Fig. IX is a horizontal

section taken on line IX IX, Fig. VIII. Fig. X is an enlarged transverse section taken on line X X, Fig. II. Fig. XI is an enlarged detail section taken on line XI XI, Fig. X. Fig. XII is a view showing the interior arrangement of one of the valves, herein designated by the numeral 43.

1 indicates the housing of my improved pasteurizer, which is of an elongated box form having a flat top 2, framed together by the suitably-arranged timbers 3 and supported by posts 4. The housing thus constructed is entirely closed, with the exception of the top forward corner, which is left open, as indicated by 5, through which opening the beer is placed in and removed from the carriers of the machine. Located beneath the housing are three rectangular tanks or basins A, B, and C. The bottom section 6 of the housing, beneath the front end or the end in which the opening 5 is formed, slopes gradually downwardly from the extreme outer end of said housing to the top of the tank A. A bottom section 7 slopes gradually downward from the rear side of the tank A to the front side of the tank B. A bottom section 8 slopes gradually downward from the rear side of the tank B to the front side of the tank C, and a fourth bottom section 9 slopes from the extreme rear end of the housing downwardly to the rear wall of said tank C. Arranged on the sides of the housing, at each end thereof, are A-shaped frames 10, provided with bearings 11 at their upper ends, in which are journaled for rotation the shafts 12, that extend transversely through the side walls of the housing 1. On the forward one of these shafts 12 is mounted a beveled gear-wheel 13, with which meshes a pinion 14, carried by a shaft 15, suitably driven. Inside the housing and upon the shafts 12 are mounted the sprocket-wheels 16, around corresponding pairs of which pass the endless chains 17. These chains are made up of elongated links 18, pivotally connected together by bolts or pins 19, and each link is provided with a bifurcated end 20, that receives the teeth of the sprocket-wheel 16. While I prefer to construct the chain in the manner just described, any other suitable sprocket-chain could be utilized. The carriers 21 are positioned between each oppositely-arranged pair of links 18, these carriers each comprising a rectangular open-top body 22, to which is secured in any suitable manner the end walls 23. Fixed to these end walls 23 and projecting outwardly therefrom

are trunnions 24, on which are mounted rollers 25, and the outer ends of said trunnions pass through the links 18 and receive nuts 26 on their outer ends.

- 5 Formed in the top of each of the end walls 23 is a row of apertures 27, or the upper end of said end walls may be cut away, as indicated by 28 in the modification shown in Fig. V. Formed in one of the end walls 23 of
10 each carrier are one or more discharge-apertures 29, that are normally closed by a valve 30, which is provided with a stem 31, that projects through the end wall. A leaf-spring 32 is secured to the inner face of the end wall
15 provided with this valve, the free end of said leaf-spring bearing directly upon the rear side of said valve.

- Located within the housing adjacent the side walls thereof and extending longitudinally between the shafts 12 are beams or
20 channel-bars 33, the tops of which are provided with grooved tracks 34, in which the rollers 25 travel. These beams, which are supported by the framework of the housing,
25 support the weight of the carriers of the pasteurizer and the loads carried thereby. Positioned on the side wall of the housing 1, adjacent the ends of the carriers in which the valves 30 are located and at a point just in
30 front of and slightly below the front shaft 12, is a curved strap or plate 35, that lies directly in the path of travel of the valve-stems 31, and said strap or plate performs the function of a cam, against which the ends
35 of the valve-stems engage to automatically open the valves in the carriers just previous to the time when said carriers are brought into a position immediately below the open end 5 of the housing. (See Figs. VIII and
40 IX and dotted lines Fig. VI.) Extending transversely between the side walls of the housing and between the two rows of carriers are a series of vertically-arranged walls 36, that form a series of compartments 37, the
45 same being slightly wider than are the carriers 22. The bottoms 38 of these compartments slope gradually from the ends toward the center, and a discharge-opening 39 is formed in the bottom of each compartment.
50 Positioned on top of the housing 1 and over the left-hand end thereof and above the tank A is a tank or water-tight compartment D. On top of the center of the housing and above the tank B is a second tank or water-tight
55 compartment E, and on top of the right-hand end of the housing and above the tank C is a third tank or compartment F. Positioned on top of the center of the housing 1 and alongside of the tank D is a header-pipe
60 40, into the under side of which are tapped short sections of discharge-pipes 41, that lead downwardly through the top of the housing and terminate just above the path of travel of the tops of the upper series of carriers.
65 These discharge-pipes 41 are so arranged as

that they are directly above the centers of the compartments 37, previously described. Leading from the tank D to the header-pipe 40 is a T-union 42, in which is located a suitable cut-off valve 43, the stem 44 of which
70 projects horizontally outward to the side of the machine. Header-pipes 45 and 46, similar in every way to the header-pipe 40 just described, occupy corresponding positions adjacent the tanks E and F, respectively,
75 said last-mentioned header-pipes being provided with the discharge-pipes 41 and T-unions to said tanks E and F.

Arranged in suitable bearings 47 immediately in front of each tank at the side of the
80 housing is a shaft 48, on which is fixed an arm 49, to the free end of which is pivotally connected the outer end of the valve-stem 44. Fixed to each shaft 48 is an arm 50, the end of which carries a weight 51, the normal
85 tendency of which is to retain the arm 49 in the position seen in Fig. X, with the valve-stem 44 pulled out to its limit of movement, each valve 43 being closed when the parts
90 occupy these positions. Carried by each shaft 48 is a third arm 49^a, to the lower end of which is pivotally connected the upper end of a vertically-arranged rod 52, the lower
end of which is connected to the forward end of a lever 53, that passes through an aperture
95 54 in the side wall of the housing. This lever 53 is fulcrumed at 55 and has its inner end bent downwardly and then curved rearwardly, as indicated by 56, which curved end
lies directly in the path of travel of the rollers 25. (See Figs. X and XI.)

The mechanism just described is for the purpose of automatically opening and closing the valves 43, and it will be understood that
105 there is an independent operating mechanism for each valve. If desired, the entire valve mechanism can be dispensed with and the water can be pumped continuously from tanks A, B, and C through an ordinary set
110 of pipe-headers 40, 45, and 46.

Located adjacent each of the tanks A, B, and C are rotary pumps 57^a, 57^b, and 57^c, and suitable tubular connections 58 lead from the tanks A, B, and C to said pumps. Leading
115 from said pumps upwardly and discharging, respectively, into the tanks D, E, and F are suitable tubular connections 59. Suitably located in each tubular connection 59 is a temperature-regulator 60 of any of the well-known forms, to and from which leads a small
120 compressed-air pipe 61, the valve in the regulator 60 controlling the passage of air through said last-mentioned pipe. Located adjacent the side wall at the base of each of the tanks A, B, and C is a horizontal pipe 62,
125 one end 63 of which leads into the tank adjacent to which it is positioned. The opposite end of each pipe 62 is provided with a steam-ejector 64, which discharges into its respective tank, to which ejector 64 leads a
130

steam-pipe 65. Each steam-ejector 64 is provided with a diaphragm-valve-controlling mechanism 66 of any well-known form, to which mechanism the corresponding compressed-air pipe 61 leads. Tapped into each one of the pipes 62 is a water-supply pipe 67, and leading from each of the pipes 62 is a drain-pipe 68, the latter each being provided with a valve 69. The water-supply pipe 67, leading into the pipe 62 of the tank A, is provided with a cut-off valve 70, to the stem of which is fixed a crank 71. Rotatably arranged in the upper portion of the side wall of the tank A is a shaft 72, on the inner end of which, inside said tank, is fixed an arm 73, carrying a float 74. To the outer end of said shaft 72 is fixed an arm 75, and a rod 76 connects the end of this arm 75 with the free end of the crank 71, this mechanism providing means for automatically opening the valve 70 in the water-supply pipe 67 when the water in the tank A is lowered beyond the required level. Located in the tank A at any suitable point and at the proper height is an overflow-pipe 77.

The operation of my improved pasteurizer is as follows: In pasteurizing beer in a machine of the foregoing description it is desirable that the water in tank A be of a temperature approximately 100° Fahrenheit, the water in the tank B at a temperature of about 125° Fahrenheit, and the water in the tank C at a temperature of approximately 142½° Fahrenheit. To maintain these temperatures, the various regulators 60 are so set as that they will act to allow air or other fluid under pressure to flow through the pipes 61 and cause the diaphragm-valve-operating mechanism 66 to be actuated to open the steam-ejectors 64 to allow steam to enter the tanks A, B, and C whenever the temperatures fall below the proper temperatures that are required to be maintained in said tanks. The driving mechanism 13, 14, and 15 of the pasteurizer is preferably arranged or driven as that the sprocket wheels and chains move intermittently or with a stop movement—that is, the carriers are stopped for a predetermined length of time intermittently during their travel through the housing—and the chains and carriers are so spaced as that the carriers of the top row or those entering the machine and traveling toward the rear one of the sprocket-wheels 16 will stop directly beneath the discharge-pipes 41 and over the chambers 37, while the lower row of carriers passing out of the machine and toward the front one of the sprocket-wheels 16 stop at points immediately beneath the upper row of carriers and beneath the discharge-apertures 39 in the bottom of the chambers 37. The pumps 57^a, 57^b, and 57^c being started, the water will be drawn from the tanks A, B, and C and be delivered, respectively, into the tanks D, E, and F or to headers 40, 45, and 46. The carriers

are loaded and unloaded through the opening 5 in the housing during the time the carriers are stopped, and after said carriers are loaded they travel forwardly through the machine immediately beneath the discharge-pipes 41, the rollers 25 riding on the tracks 34. Whenever one of the rollers 25 contacts with the curved lower end 56 of the first of the levers 53, the corresponding shaft 48 will be rocked and the corresponding valve-rod 44 will be moved inwardly, opening the valve 43 of the tank D, and water therefrom will discharge through the T connection 42, open valve 43, into the header 40, and from thence through the discharge-pipes 41 into the carriers immediately below said pipes. The stay or rest of each receptacle beneath the respective discharge-pipes 41 is of sufficient duration or length of time to permit a flow of water equal to the capacity of the respective receptacles. As the receptacles are quite shallow, being only about twelve inches in depth, and as the flow of water from the pipes 41 is a forced flow, (due partly to gravity and partly to the fact that the tanks D, E, and F are closed tanks into which the water is discharged by the force-pumps 37^a.) it to a great extent displaces the water in the tanks, or at least thoroughly mixes therewith, and thus acts to change the temperature units of the beer in the bottles. The levers 53 and corresponding valve-opening mechanisms are so arranged as to hold the valves open during the period of time that the carriers are stopped, so that water at a temperature of approximately 100° Fahrenheit pumped into the tank D from the tank A is being discharged into the carriers which have just been loaded with the cold beer. When the carriers beneath the tank D become filled with water, the overflow will discharge through the apertures 27 and pass downwardly into the compartments 37, and from thence the water will discharge through the apertures 39 in the bottoms of said compartments into the carriers immediately beneath said compartments, which latter carriers are the ones immediately over the tank A and which are about to pass out of the pasteurizer. The foregoing operation is repeated simultaneously with the two succeeding pairs of tanks B and E and C and F, the water of a temperature of approximately 125° Fahrenheit being pumped from the tank B into the tank E and being discharged therefrom through the header 45 and its discharge-pipes into the carriers beneath the tank E and thence passing downwardly into the compartments 37 and carriers beneath said compartments and finally back into the tank B. The water at a temperature of approximately 142° Fahrenheit is pumped from the tank C into the tank F and discharges from thence downwardly through the pairs of carriers arranged one above the other and finally passing back into said tank C. It will be noted that in my improved pasteurizer the water of gradually-

increasing temperatures is applied to the beer in the carriers as the same travel along in the upper part of the housing from the front pair of sprocket-wheels toward the rear pair, and

5 when the beer in said carriers reaches the first outlet-pipe 41 of header 46 it is receiving water of the maximum temperature, and from this point on back to rear sprocket-wheels 16 and through the lower portion of the housing up

10 to a point immediately below said mentioned outlet-pipe 41 in header 46 this maximum-temperature application is maintained continuously. After leaving the point where the maximum temperature is last applied the tem-

15 perature of the water applied to the beer gradually decreases as the water delivered to the ingoing carriers overflows and is caused to discharge into the corresponding outgoing carriers. As a result the beer is gradually

20 brought up to the maximum temperature and correspondingly brought back to the minimum temperature of the water in the pasteurizer, and in so doing said beer is very effectually pasteurized. It is desirable that

25 the outgoing beer be cooled so that it can be readily handled when taken from the carriers, and by my improved construction the low temperature of the water delivered to the first ingoing carrier is also delivered to

30 the last outgoing carrier, for the reason that said carriers are arranged one above the other, and the water from the upper carrier after being cooled by coming in contact with the cold bottles of beer will discharge into the

35 lower outgoing carrier and cool said beer to the desired degree. The beer in the successive ingoing carriers beneath the tank D, receiving water of a temperature approximately 100° Fahrenheit, will gradually become heated to

40 a higher degree, and at the same time the water discharging into said carriers will become correspondingly cooled by coming in contact with the receptacles containing the beer, and said cooler water being displaced by the

45 water of a higher temperature discharging from the pipes 41 will pass through the apertures 27 and discharge downwardly into the compartments 37, from thence into the corresponding outgoing carriers beneath said compartments, and finally out of said carriers back

50 into the tank A. This action of gradually heating the ingoing and correspondingly cooling the outgoing beer is carried out as the carriers pass beneath the tanks E and F and

55 over the tanks B and C. The temperatures in the tanks A, B, and C are kept at the proper degrees by the action of the regulators 60, which control the inlet of steam into said tanks. Just previous to the time that the carriers are

60 brought into the open end 5 of the housing the valve-stems 31 successively contact with the plates or straps 35 and the valves 30 are opened, to be so held while the carriers are stopped, which allows all the water in said

65 carriers to discharge out through the openings

29 onto the inclined bottom 6 and from thence into the tank A. The weights 51 and various connections automatically close the valves 43 in the pipes 40, 45, and 46 immediately after the rollers 25 pass from beneath the bent lower

70 ends 56 of the levers 53, and said valves remain thus closed while the carriers are moving to their next stopping-point, thus cutting off the flow of water into the carriers while the latter are moving.

75 In the foregoing description the chains and carriers are specified as being moved intermittently, and while this movement is preferable it is not necessary, as practically the same results could be obtained in a machine

80 where the carriers travel continuously instead of intermittently. Where the continuous movement is used, the valves 43 and their actuating mechanisms would be done away with and the water would be pumped continuously

85 from the tanks A, B, and C into the tanks or headers on top of the housing. The movement of the carriers in a pasteurizer of my improved construction is necessarily very slow, and I

90 find that the time required to obtain the best results for pasteurization is approximately forty minutes, and the movement of the chains and carriers may be correspondingly timed, so that this period of time will elapse from

95 the first application of the water of maximum temperature to the carriers containing the beer to the time of the final application of the water of maximum temperature to said carriers. This initial and final application of the

100 water of maximum temperature takes place under the left-hand one of the discharge-pipes 41 of the header 46 and immediately beneath the left-hand end of the tank F.

105 It will be seen that I have produced a pasteurizer wherein the beer in the carriers is very gradually heated step by step until it reaches the maximum temperature required for pasteurization, the highest temperature of water in the machine being the same as the

110 temperature required for perfect pasteurization. In other words, it is not necessary to heat any of the water to a higher temperature than a proper degree required to completely pasteurize the beer or other product

115 placed in the carriers.

I claim as my invention—

1. In a pasteurizer, an endless conveyer, carriers arranged on said conveyer for receiving the product to be pasteurized, means whereby

120 warming-water is delivered to the carriers, means whereby water of maximum temperature is delivered to the carriers, and means for directing said first-mentioned water to the carriers after the latter have received the

125 water of maximum temperature, substantially as set forth.

2. In a pasteurizer, an endless conveyer, carriers moved by said conveyer, means whereby

130 warming-water of varying temperatures is delivered into said carriers, means whereby

water of maximum temperature is directed to the carriers, and means whereby said water of varying temperatures is directed to the carriers after the latter have received the water of maximum temperature, substantially as set forth.

3. In a pasteurizer, an endless conveyer, means for moving said conveyer intermittently, carriers adapted to be moved by said conveyer and which receive the product to be pasteurized, means whereby warming-water is directed to the carriers, means whereby water of maximum temperature is directed to the carriers, and means whereby said first-mentioned water is directed to the carriers after the carriers have received the water of maximum temperature, substantially as set forth.

4. In a pasteurizer, an endless conveyer, carriers moved by said conveyer, means for imparting an intermittent movement to said conveyer, means whereby warming-water of varying temperatures is discharged into said carriers, means whereby water of maximum temperature is delivered to the carriers, and means whereby said water of varying temperatures is delivered to said carriers after the latter have received the water of maximum temperature, substantially as set forth.

5. In a pasteurizer, an endless conveyer arranged to move forward and return beneath itself, carriers adapted to be moved by said conveyer and to receive the product to be pasteurized, means whereby warming-water is delivered to the upper tier of the carriers, means whereby water of maximum temperature is delivered to the carriers, and means whereby said first-mentioned water is delivered to the lower tier of the carriers after the latter have received the water of maximum temperature, substantially as set forth.

6. In a pasteurizer, a carrier arranged to move forwardly in one direction and return beneath itself, carriers adapted to be moved by said conveyer and to receive the product to be pasteurized, means whereby warming-water of varying temperatures is adapted to be delivered to the upper tier of carriers, means whereby water of maximum temperature is

adapted to be delivered to said carriers, and means whereby the water of varying temperatures is adapted to be delivered to said carriers on their return movement and after they have been subjected to the action of the water of maximum temperature, substantially as set forth.

7. In a pasteurizer, a carrier adapted to be moved in one direction and to return beneath itself, carriers adapted to be moved by said conveyer and to receive the product to be pasteurized, means whereby warming-water is delivered to the upper tier of carriers, means whereby water of maximum temperature is delivered to the upper tier of carriers, means whereby said water of maximum temperature is delivered to the lower tier of carriers, and means whereby the first-mentioned water is delivered to the lower tier of carriers after the latter have received the water of maximum temperature, substantially as set forth.

8. In a pasteurizer, a housing, an endless conveyer horizontally arranged in said housing, carriers on said endless conveyer, a plurality of tanks arranged in the lower portion of the housing, a corresponding plurality of tanks arranged on top of the housing, means whereby pasteurizing-water is conveyed from the lower tanks to the upper tanks, and means whereby said pasteurizing-water is conveyed from the upper tanks into and through the carriers and finally back into the lower tanks, substantially as set forth.

9. In a pasteurizer, a plurality of rows of carriers arranged one above the other, means whereby said rows of carriers are moved intermittently in opposite directions, means whereby pasteurizing-water is delivered to the upper row of carriers and caused to overflow therefrom into the lower row of carriers, and means whereby all of said carriers are emptied of the pasteurizing-water at a certain period of their travel, substantially as set forth.

WILLIAM J. RUFF.

In presence of—

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JOHN L. DECKER.