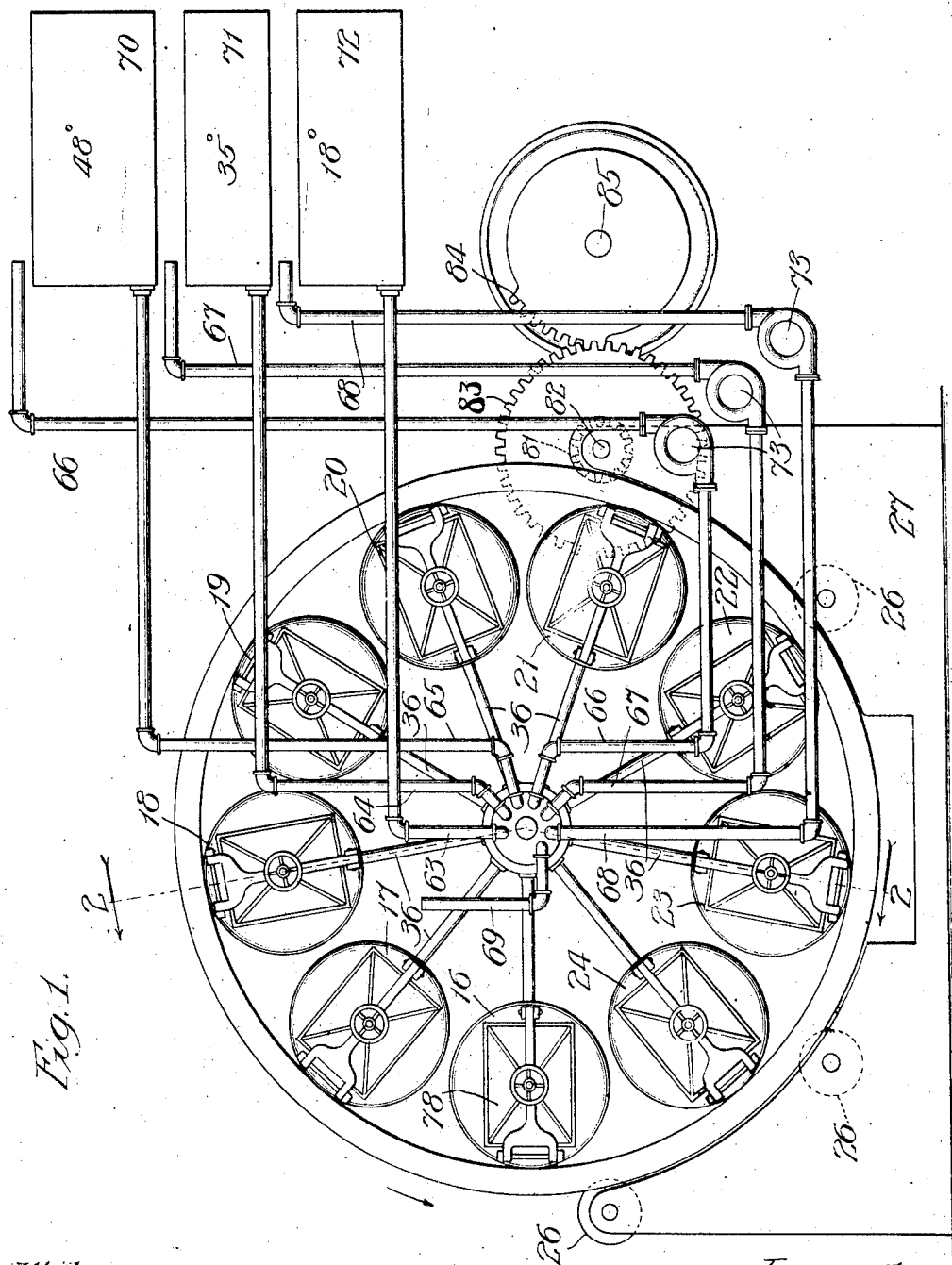


991,808.

5 SHEETS—SHEET 1.



John Enders
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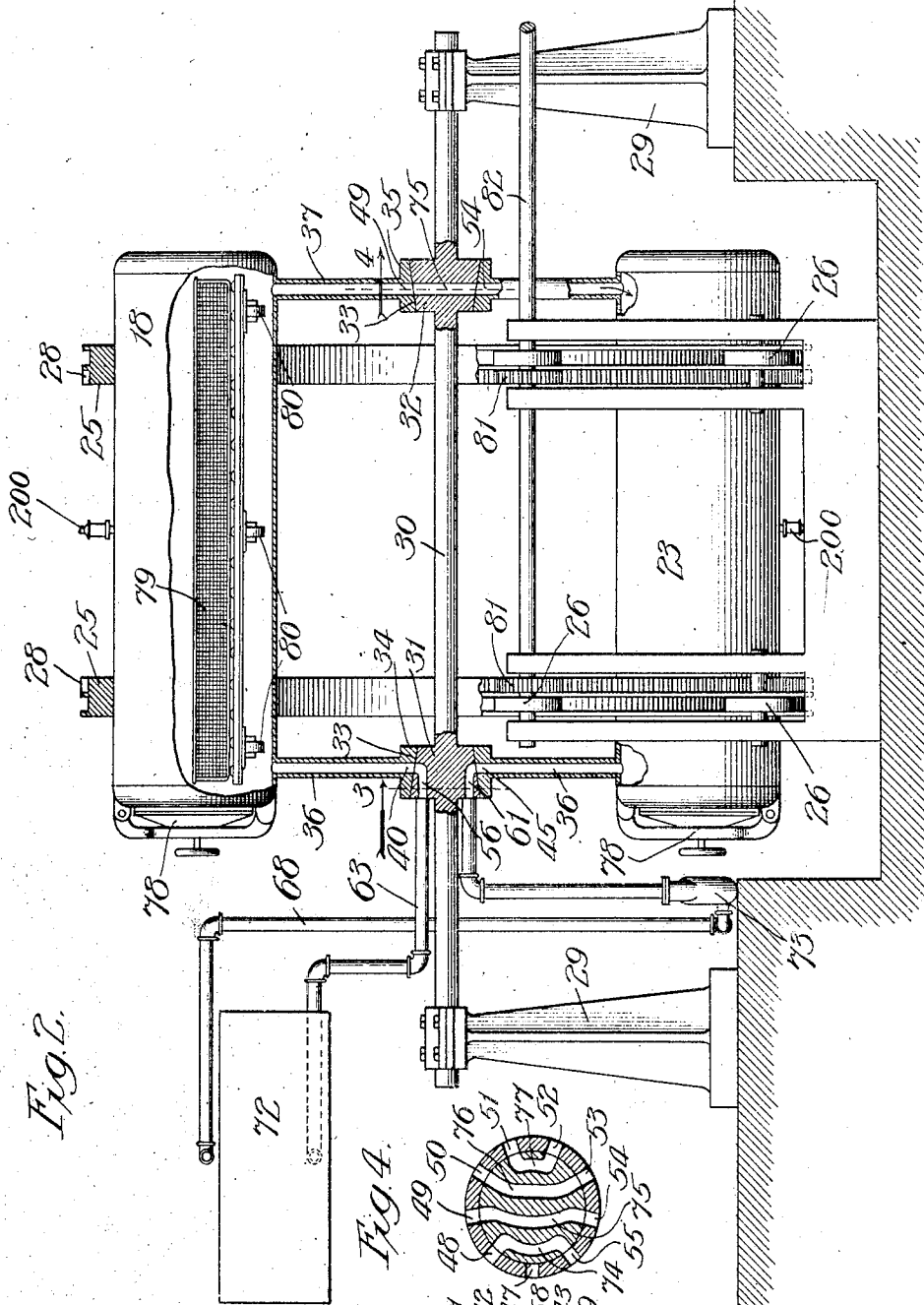
August Tiesse,
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991,808.

A. TIESSE.
PASTEURIZING APPARATUS.
APPLICATION FILED MAR. 16, 1910.

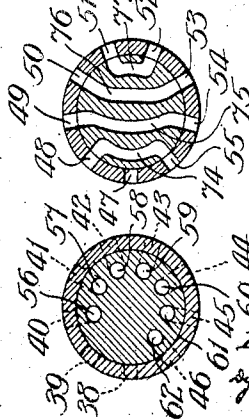
Patented May 9, 1911.

5 SHEETS-SHEET 2.



Witnesses:
John Enders
Chas. A. Bull.

Fig. 3.



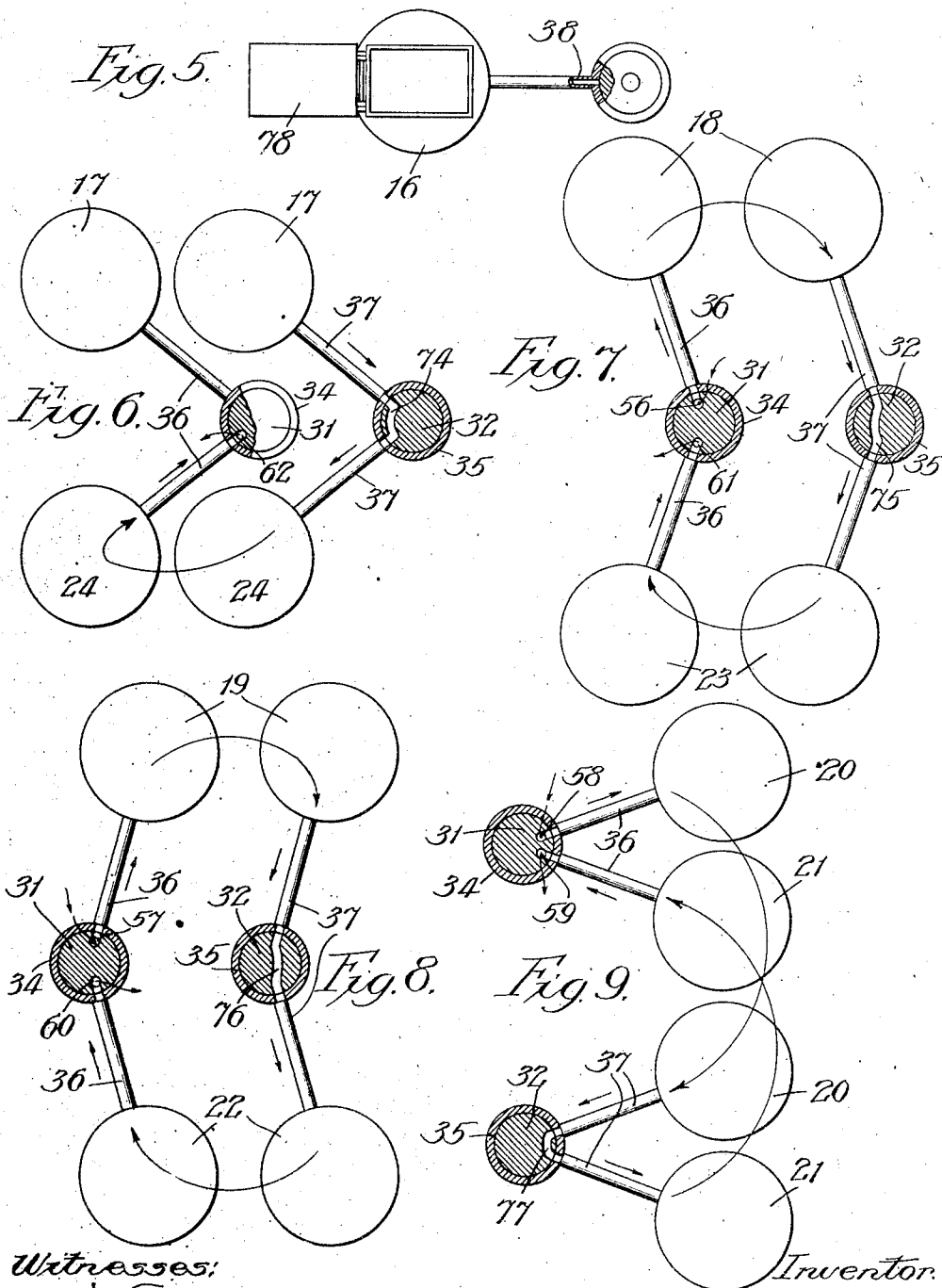
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991,808.

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PASTEURIZING APPARATUS.
APPLICATION FILED MAR. 16, 1910.

Patented May 9, 1911.
5 SHEETS-SHEET 3.



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APPLICATION FILED MAR. 16, 1910.

991,808.

Patented May 9, 1911.

5 SHEETS—SHEET 4.

Fig. 11.

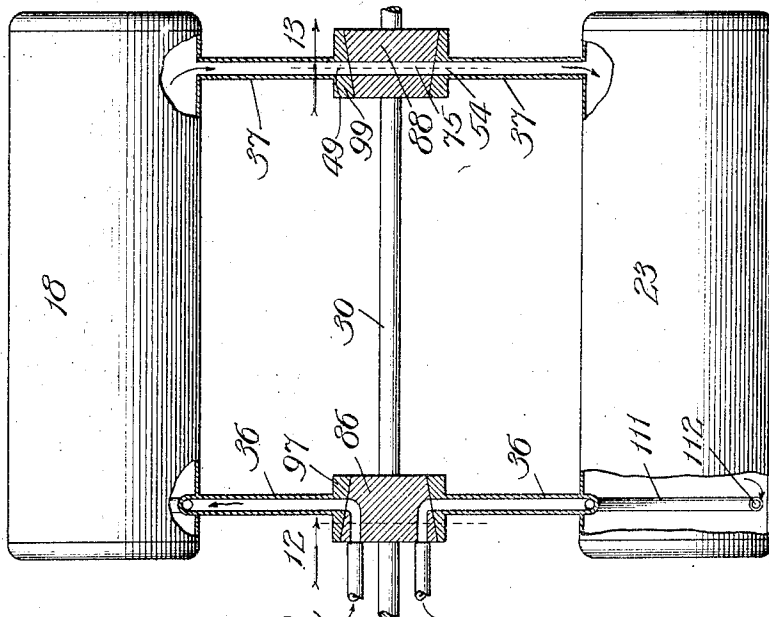
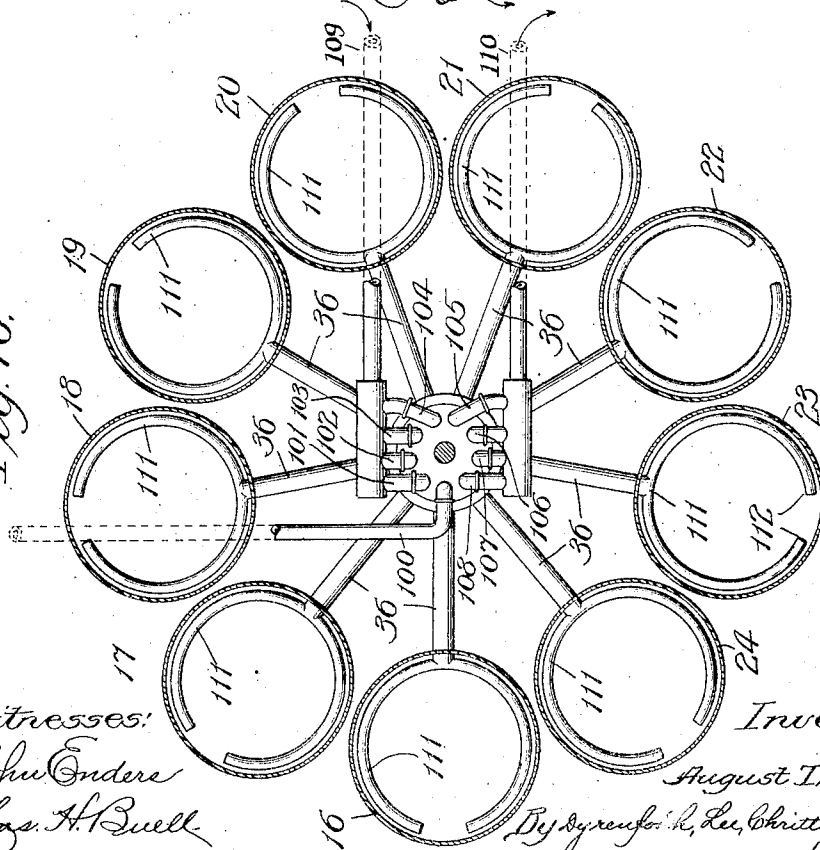


Fig. 10.



Witnesses:

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Chas. H. Buell

Inventor:

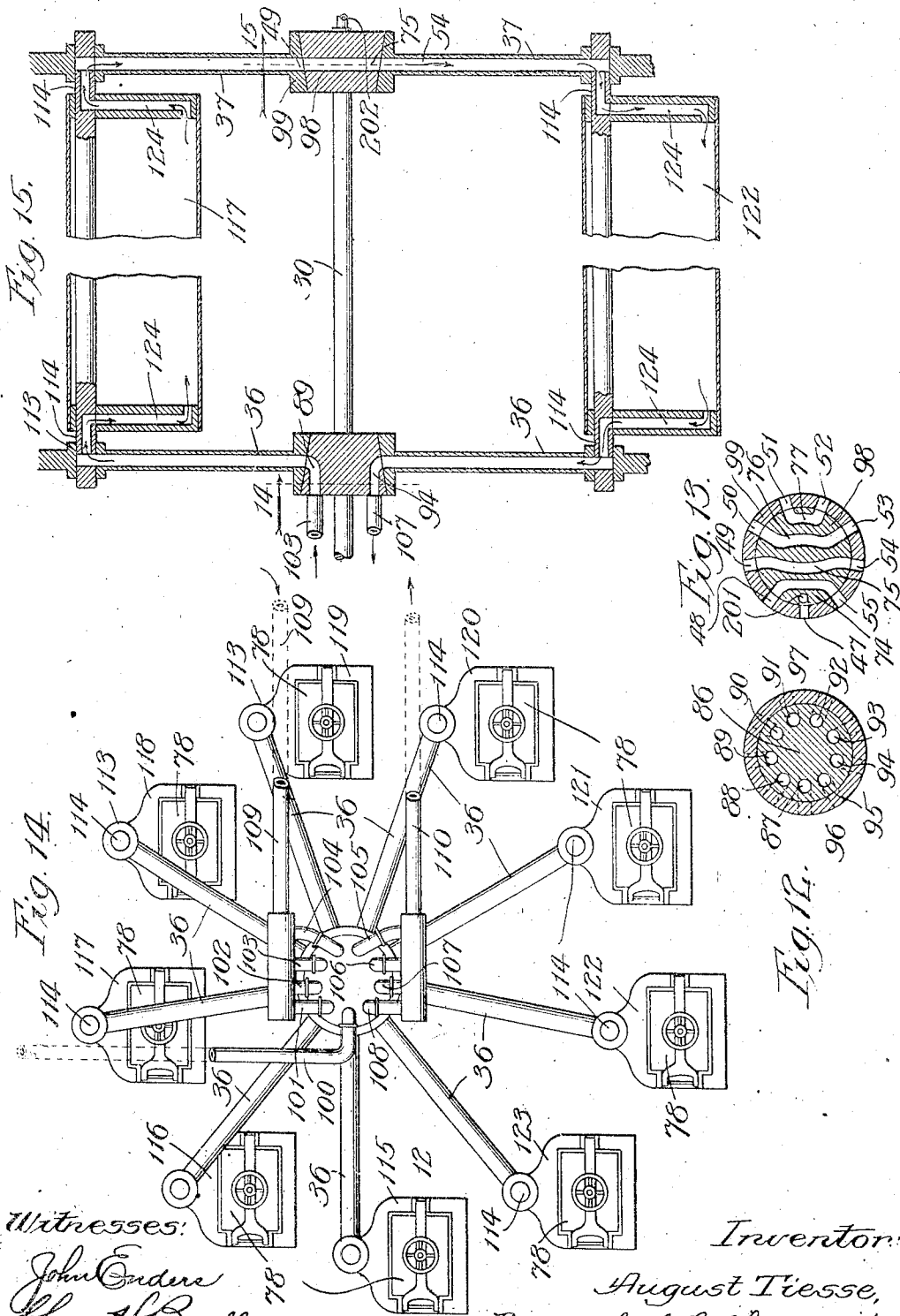
August Tiesse,
By Dyreus, K. Lee, Chittton & Wiles
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A. TIESSE.
PASTEURIZING APPARATUS.
APPLICATION FILED MAR. 16, 1910.

991,808.

Patented May 9, 1911.

5 SHEETS—SHEET 5.



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UNITED STATES PATENT OFFICE.

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PASTEURIZING APPARATUS.

991,808.

Specification of Letters Patent.

Patented May 9, 1911.

Application filed March 16, 1910. Serial No. 549,769.

To all whom it may concern:

Be it known that I, AUGUST TIESSE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Pasteurizing Apparatus, of which the following is a specification.

My object is to provide a construction of pasteurizer by which the pasteurizing operation may be carried on continuously, and under pressure when desired, whether the pasteurizing agent be steam or water, and by which pasteurization of the material to be treated may be effected expeditiously and uniformly.

Referring to the accompanying drawings—Figure 1 shows by a view in elevation a pasteurizing apparatus constructed in accordance with my invention, the apparatus illustrated in this figure being designed for use with water as the pasteurizing agent. Fig. 2 is a view in elevation of the pasteurizing apparatus showing portions thereof in section, this view being taken from the right-hand side of Fig. 1 and at right-angles thereto and the section being taken at line 2 on Fig. 1 and viewed in the direction of the arrow. Fig. 3 is a section taken at the line 3 on Fig. 2 and viewed in the direction of the arrow, this section being taken through one of the two valve-constructions employed. Fig. 4 is a section taken at the line 4 on Fig. 2 and viewed in the direction of the arrow, this view being taken through the other of the valve-constructions of the pasteurizer. Fig. 5 is a diagrammatic view in side elevation of one of the closed receptacles for receiving the material to be pasteurized, this view illustrating the manner of preventing the pasteurizing agent from entering the receptacles when they are in position for being emptied of the pasteurized material and filled with raw material to be pasteurized. Fig. 6 is a diagrammatic view in elevation and partly in section of the receptacles adjacent to the one illustrated in Fig. 5 and arranged above and below it, together with the connections between these receptacles at their opposite ends. Fig. 7 is a similar view of the two receptacles adjacent to those shown in Fig. 6, together with their inlet and outlet connections. Fig. 8 is a similar view of the two receptacles next to those shown in Fig. 7, together with their inlet and outlet connections;

and Fig. 9, a similar view of the two remaining receptacles and their inlet and outlet connections, Figs. 5 to 9 inclusive showing, respectively, only those portions of the controlling valves which operate in conjunction with the respective receptacles shown in the figures, for clearness of illustration. Fig. 10 is a view in end elevation of my improved pasteurizing apparatus adapted for use with steam as the pasteurizing fluid. Fig. 11 is a view in elevation of the construction shown in Fig. 10, but taken at a right-angle thereto, with certain parts of the apparatus shown in section. Fig. 12 is a section taken at the line 12 on Fig. 11 and viewed in the direction of the arrow. Fig. 13 is a section taken at the line 13 on Fig. 11 and viewed in the direction of the arrow. Fig. 14 is a view like that of Fig. 10 showing a modification of the receptacles for receiving the material to be pasteurized; and Fig. 15, a view in vertical sectional elevation of the apparatus illustrated in Fig. 14.

Referring particularly to Figs. 1 to 9 inclusive, 16 to 24 inclusive denote a plurality of closed receptacles shown as of cylindrical form and secured equi-distant from each other to the inner surfaces of a pair of spaced parallel rings 25, the rings 25 resting at their outer peripheries upon rollers 26 journaled in a base 27, a portion of the periphery of each ring being in the form of a gear as represented at 28 for a purpose hereinafter set forth. Extending through the center of the rings 25 and journaled in bearings 29, is a shaft 30 which carries two spaced heads 31 and 32, respectively, of frusto-conical form tapering inwardly as represented at 33 in Fig. 2, and journaled on these heads are internally tapered sleeves 34 and 35, respectively, which are provided with radially extending arms 36 and 37, respectively, connecting with the opposite ends of the receptacles 16 to 24 inclusive as illustrated of those shown in Fig. 2. The sleeve 34 and arms 36 contain conduits 38 to 46 inclusive, which are spaced equidistant from each other and communicate, respectively, with the interior of the receptacles 16 to 24, inclusive, at their left-hand ends in Fig. 2; when these receptacles are in the positions illustrated in Fig. 1, and the sleeve 35 and arms 37 contain conduits 47 to 55 inclusive which are likewise spaced

equidistant from each other and communicate, respectively, with the interior of the receptacles 16 to 24 inclusive at their right-hand ends in Fig. 2, when the receptacles 5 are in the positions illustrated in Fig. 1.

In the particular construction illustrated, the head 31 contains seven angle-shaped conduits 56 to 62 inclusive which open through its periphery and its outer face as represented of those conduits illustrated in Fig. 2, the conduits 56 to 62 inclusive being so arranged that when the receptacles occupy the positions represented in Fig. 2 they will communicate with the conduits 40 to 46 inclusive, respectively. The conduits 56 to 62 inclusive communicate with pipes 63 to 68 inclusive and an exhaust-pipe 69, respectively, the pipes 63, 64 and 65 leading into the lower ends of tanks 72, 71 and 70, respectively, and the pipes 66, 67 and 68 containing pumps 73 are adapted to discharge into the tanks 70, 71 and 72 respectively, these tanks being designed to receive water for circulation through the receptacles 16 to 24 inclusive as hereinafter described, and maintain it at different degrees of temperature for producing gradual heating of the material to be pasteurized, pasteurization of the same and subsequent cooling thereof, as for instance the water in tank 72 may be maintained at 18° R., that in tank 71 at 35° R. and that in tank 70 at 48° R., though it will be understood from the following description of the operation of the apparatus that the temperature of the water in the different tanks may be varied as conditions require. The head 32 contains four passages 74, 75, 76 and 77, which are so disposed as to cause the conduits 48, 49, 50 and 51 to communicate with the conduits 55, 54, 53 and 52, respectively, when the receptacles occupy the positions illustrated in Fig. 2 for effecting circulation therethrough of the pasteurizing water as hereinafter described. It will be noted from the foregoing that the stationary heads 31 and 32 form with their cooperating sleeves 34 and 35, respectively, valves for the conduits at the opposite ends of the receptacles for controlling the flow of water from the several tanks into and out of the latter when the rings 25 are intermittently rotated and the receptacles carried thereby move in a circular path.

Each receptacle 16 to 24 inclusive is provided at its opposite end with a swinging door 78, which, when closed, renders the receptacle fluid-tight. The supports for the bottles, cans or the like, containing the material to be pasteurized are represented at 79, these supports preferably being made of wire fabric in the form of baskets provided on their under sides with rollers 80 which rest on the inner surfaces of the receptacles and by which the supports are always maintained in upright condition therein, regard-

less of the positions occupied by the receptacles during the operation of the apparatus as hereinafter described.

In the operation of the apparatus, the rings 25 are caused to be intermittently rotated and the receptacles 16 to 24, inclusive, moved in a circular path to advance the receptacles step by step to permit of the withdrawal of the pasteurized material, their recharging with new material and subjecting the material charged into the receptacles to the pasteurizing agent circulated through these receptacles from the tanks. This intermittent movement may be effected in any desired manner, convenient means for accomplishing this purpose being those represented, a description of which is as follows: The gears 28 mesh with pinions 81 rigid on a shaft 82, the latter carrying a gear 83 adapted to mesh with a mutilated gear 84 carried on a shaft 85 driven in any suitable manner. The effect of driving the gear 83 from the mutilated gear 84 is that of causing the rings 25 and receptacles 16 to 24 inclusive to be rotated throughout a portion only of the rotation of the shaft 85, the gears being so proportioned that the receptacles are moved a predetermined distance with each engagement of the gear 84 with the gear 83 and are caused to remain at rest for a predetermined length of time, as for instance in the construction illustrated the receptacles would be at rest for a period five times as long as the period during which they move, and each time the gear 84 engages with the gear 83 the rings and receptacles would travel one-ninth of a complete revolution for the purpose hereinafter explained.

The operation of the apparatus is as follows: The receptacles 16 to 24 inclusive are charged with the supports 79 carrying the material to be pasteurized by inserting them through their open, door-controlled ends, when the receptacles are successively moved into the position represented of receptacle 16 in Fig. 1. Assuming that the receptacles occupy the positions represented in Fig. 1 and that the pumps 73 are operating, the receptacle 16 is empty and in loading position, the inner ends of its conduits 38 and 47 being closed, as represented in Figs. 3 and 4, by the heads 31 and 32; the conduit 39 of casing 17 is closed and its conduit 48 is in communication with the conduit 55 of casing 24 through the medium of the passage 74 in the head 32, the outlet-conduit 46 of receptacle 24 being open to the exhaust-pipe 69, all as represented in Figs. 1, 3, 4 and 6; the conduit 40 of casing 18 is open to the pipe 63 leading from tank 72 through the medium of the conduit 56 in the head 31, and the other conduit 49 of receptacle 18 communicates with the conduit 54 of receptacle 23 through the medium of

the passage 75 in the head 32 as represented in Figs. 1, 3, 4 and 7, the conduit 45 of casing 23 communicating through the passage 75 in the head 32 with the return pipe 68; the conduit 41 of receptacle 19 is open to the pipe 64 through the conduit 57 in the head 31, and the conduit 50 thereof communicates through the passage 76 in the head 32 with the conduit 53 in receptacle 22, the other conduit 44 of receptacle 22 communicating through the conduit 60 with the return pipe 67 leading to tank 71; and the conduit 42 of receptacle 20 communicates with the pipe 65 through the conduit 58 in the head 31, and its conduit 51 communicates with the conduit 52 in the receptacle 21 through the passage 77 in the head 32, the other conduit 43 of receptacle 21 communicating through the conduit 59 in the head 31 with the return-pipe 66 to tank 70. Thus, when the receptacles are in the positions illustrated in Fig. 1, the water in receptacle 17 will flow into receptacle 24, receptacle 24 having been previously emptied when it occupied the position occupied by receptacle 17 in Fig. 1, the air in receptacle 24 venting through the pipe 69; the water from tank 72 will flow through receptacles 18 and 23; the water from tank 71 will circulate through receptacles 19 and 22; and the water from tank 70 will circulate through receptacles 20 and 21, with the effect of causing material in the receptacles 18 to 23 inclusive to be subjected to water circulated through these receptacles from the respective tanks. When the gear 84 in its rotation meshes with the gear 83 the receptacles are caused to travel in a circular path to the left in Fig. 1 a distance equal to one-ninth of the circumference of the circle in which they lie, to cause all of the receptacles to be moved one-ninth of a revolution in the direction indicated by the arrow in Fig. 1. The effect of thus operating the apparatus is to cause receptacle 17 to be moved into the position occupied by receptacle 16 in Fig. 1 and advance each of the other receptacles to the positions formerly occupied by the next receptacle in advance of it. As the heads 31 and 32 are stationary and the sleeves 34 and 35 rotate with the receptacles, the operation of the latter as described destroys the communications between the receptacles described when in the positions illustrated in Fig. 1 and establishes new communications between the several receptacles as is manifest from the drawings. The receptacle 17 having been emptied of the water contained therein by draining it into the receptacle 16, it is now in a position to permit of the removal of the pasteurizing material and the introduction therein of raw material to be pasteurized, the water in receptacle 18 draining during this operation into receptacle 16. It will be noted that by the time the receptacles

have made a complete rotation by the intermittent action referred to, the material therein will have been first subjected to water at increasing temperatures and then to water at the pasteurizing temperature, the material thereafter being subjected to water at decreasing temperatures for cooling it.

From the foregoing description, it will be understood that while the operation of withdrawing the pasteurized material, and substituting for it raw material, is being performed in the receptacles as they successively occupy the position represented of casing 16 in Fig. 1, the material in the other receptacles is being subjected to the water from the tanks 70, 71 and 72, and thus the operation of the pasteurizer is rendered continuous. The parts of the drive mechanisms for the receptacles may be so proportioned as to provide as long periods of rest, during which the pasteurizing fluid is acting upon the material, as desired.

To insure the discharge of the water from the several receptacles as they successively occupy the position represented of receptacle 17 in Fig. 1, I provide on each receptacle a vacuum valve 200 which operates in a well known manner to permit air to enter the receptacles when the internal pressure is less than that of the atmosphere.

While I prefer to employ a plurality of tanks for furnishing water to the receptacles at different temperatures and to provide nine of the receptacles for the material to be pasteurized, I do not wish to be understood as intending to limit my invention to this feature of the construction, as the number of receptacles may be increased or diminished as desired, and likewise the number of tanks, in some cases the use of water at pasteurizing temperature only being desirable.

In Figs. 10 to 13 inclusive, I have illustrated my invention as applicable to the use of steam as the pasteurizing fluid. In this construction, in which the parts corresponding to those shown in the preceding figures are designated by the same numerals, the head 86, which corresponds to the head 31 of the preceding figures, differs therefrom in the particular of having nine right-angled conduits 87 to 96 inclusive instead of the seven provided in the head 31, the sleeve 97 coöperating therewith and corresponding to the sleeve 34, and the head 98 and sleeve 99 corresponding to the head 32 and sleeve 35, respectively, being of the same construction and provided with the same conduits and passages as illustrated and described of the similar parts 34, 32 and 35, respectively, of the preceding figures, excepting that the head 98 contains a port 201 which registers with the passage 47 when the receptacles occupy the positions represented in Fig. 10 and is adapted to register successively with

the passages 48 to 55 inclusive as the receptacles are advanced in their circular path of movement, as hereinafter described. In this construction, the conduits 87 to 96 inclusive communicate with pipes 100 to 108 inclusive; respectively, the pipes 101 to 104 inclusive communicating with a steam-supply pipe 109; the pipes 105 to 108 inclusive communicating with a return steam-pipe 110, and the pipe 100 serving as an exhaust, the pipes 109 and 110 being connected with any suitable source of steam-supply for introducing steam into the pipes 101 to 104 inclusive, thence through the conduits 88 to 91 inclusive and through the conduits 39 to 42 inclusive, thence through the receptacles 17 to 20 inclusive, and from these receptacles through the receptacles 21 to 24 inclusive communicating therewith through the medium of the valve formed of the parts 98 and 99 as described of the construction illustrated in the preceding figures. Steam courses through the various receptacles containing the material to be pasteurized at all times, excepting when such receptacles successively occupy the position occupied by receptacle 16 in Fig. 10, in which position its steam-conduits are closed to the steam-supply and communication is made between it and the exhaust-pipe 100 which enables the steam to escape from the receptacle to place it in a condition in which its pasteurized contents may be removed and raw material for pasteurization may be substituted. It is preferred that the conduits for each receptacle leading into the valve formed of the parts 96 and 87 open into a pipe terminating in a hollow ring-shaped pipe 111, having a section thereof broken away to afford oppositely directed openings 112 which, when the receptacles are at the lowermost point reached by them in their movement in a circular path, extend close to the bottom of the receptacles and serve to permit of the withdrawal, under the pressure of the outgoing steam of the water of condensation collected therein.

The receptacles of this construction may be driven as described of the receptacles in the preceding figures, to cause them to successively assume the position represented of receptacle 16 in Fig. 10 to permit of the removal therefrom of the pasteurized material and the substitution therefor of material to be pasteurized. The port 201 communicates with a pipe 202 which leads to any suitable source of compressed air supply whereby when the receptacles successively assume the position represented of receptacle 16 in Fig. 10, the steam will be forced therefrom through the exhaust-pipe 100.

A modification of the receptacles of the construction shown in Figs. 1 to 11 inclusive is represented in Figs. 14 and 15. In this case, the receptacles instead of remaining in fixed position and inverting as they move

through a circular path, are pivotally supported to cause them to remain upright at all times, a description of the particular construction illustrated being as follows: The arms 36 and 37 are provided toward their outer ends with transversely-extending bearings 113 in which tubular extensions 114 carried by receptacles 115 to 123 inclusive are journaled, these tubular extensions communicating with downwardly-extending conduits 124 in the receptacles, and these conduits opening into the interior of the latter. The receptacles 115 to 123 inclusive are door-controlled at their ends as described of the preceding constructions, to permit of the introduction therein and withdrawal therefrom of supports carrying the material to be pasteurized. The details of the construction for supplying steam to the various receptacles and withdrawing it therefrom are the same as those illustrated and described of the construction in Figs. 10 to 13 inclusive.

It will be noted that in all of the constructions illustrated the pasteurizing operation may be continuously carried on and that uniform pasteurization may be effected. It will furthermore be noted that by providing a plurality of receptacles adapted to be maintained, during the pasteurizing operation in air-tight condition, the pasteurizing medium may be circulated or passed therethrough under any pressure desired, which is of especial advantage in the case of pasteurization of beer in bottles, in which case the increased pressure exerted by the gases formed in the bottles may be compensated for to equalize the strain on the latter and thus prevent breakage from this cause.

What I claim as new, and desire to secure by Letters Patent, is

1. A pasteurizing apparatus comprising, in combination, a plurality of closed receptacles supported to rotate in a circular path and adapted to receive the material to be pasteurized, and valve-mechanism for directing pasteurizing fluid through the receptacles said valve-mechanism being formed of relatively movable parts communicating respectively with a source of pasteurizing fluid and with said receptacles, one of said parts moving with said receptacles and the other of said parts being stationary.

2. A pasteurizing apparatus comprising, in combination, a plurality of closed receptacles supported to move in a circular path and adapted to receive the material to be pasteurized, and a pair of valves arranged centrally with said receptacles and each formed with a stationary member and a co-operating member movable with said receptacles, the parts of said valves containing conduits communicating with said receptacles and a source of pasteurizing fluid, and

adapted to be moved into and out of registration with each other for introducing pasteurizing fluid into said receptacles, for the purpose set forth.

5 3. A pasteurizing apparatus comprising, in combination, a plurality of closed receptacles supported to move in an endless path and adapted to receive the material to be pasteurized, and valve-mechanism, arranged
10 centrally of said receptacles and operating automatically to effect the introduction into and the discharge from said receptacles of the pasteurizing fluid, formed of relatively movable parts communicating respectively
15 with the source of pasteurizing fluid and with said receptacles, one of said parts moving with said receptacles.

4. A pasteurizing apparatus comprising, in combination, a plurality of closed receptacles supported to move in a circular path and adapted to receive the material to be pasteurized, and valves arranged centrally of said receptacles, the parts of said valves containing conduits communicating with
25 said receptacles and a source of pasteurizing fluid, respectively, and adapted to be moved into and out of registration with each other upon advancing said receptacles in a circular path for introducing pasteurizing fluid into said receptacles, for the purpose set forth.

5. A pasteurizing apparatus comprising, in combination, a plurality of closed receptacles supported to move in an endless path and adapted to receive the material to be pasteurized, and valve-mechanism for directing pasteurizing fluid through said receptacles when the latter occupy predetermined positions, said valve-mechanism being formed of relatively movable parts communicating, respectively, with a source of pasteurizing fluid and with said receptacles, one of said parts being movable with said receptacles.

6. A pasteurizing apparatus comprising, in combination, a plurality of closed receptacles supported to move in an endless path and adapted to receive the material to be pasteurized, and valve-mechanism formed of relatively movable parts communicating, respectively, with a source of pasteurizing fluid and with said receptacles, one of said parts moving with said receptacles, said valve-mechanism being constructed and arranged to cause the fluid to pass through said receptacles excepting when they occupy certain predetermined positions for recharging with the material to be pasteurized.

7. A pasteurizing apparatus comprising, in combination, a plurality of closed receptacles supported to move in an endless path and adapted to receive the material to be pasteurized, and valve-mechanism formed of relatively movable parts communicating, respectively, with a source of pasteurizing

fluid and with said receptacles, one of said parts being movable with said receptacles, said valve-mechanism being constructed and arranged to cause the fluid to pass through the receptacles when in certain positions and to vent the same successively of their contained fluid as the receptacles are advanced in a curved path of movement, for the purpose set forth.

8. A pasteurizing apparatus comprising, in combination, a plurality of closed receptacles supported to move in an endless path, and adapted to receive the material to be pasteurized, and valve-mechanism disposed centrally of said receptacles and formed of relatively movable parts communicating, respectively, with a source of pasteurizing fluid and with said receptacles, one of said parts moving with said receptacles, said valve-mechanism being constructed and arranged to cause the fluid to pass through said receptacles and to vent the latter successively of their contained fluid as they are advanced in their circular path of movement.

9. A pasteurizing apparatus comprising, in combination, a plurality of closed receptacles supported to move in an endless path, and adapted to receive the material to be pasteurized, and valve-mechanism formed of relatively movable parts communicating, respectively, with a source of pasteurizing fluid and with said receptacles, one of said parts moving with said receptacles, said valve-mechanism being constructed and arranged to pass the fluid through the receptacles when the latter occupy certain predetermined positions, to vent the same when they occupy another position and permit them to be filled when they occupy still another position, for the purpose set forth.

10. A pasteurizing apparatus comprising, in combination, a plurality of closed receptacles supported to move in an endless path and adapted to receive the material to be pasteurized, sources of supply of fluid at different temperatures, and valve-mechanism formed of relatively movable parts communicating, respectively, with said sources of supply and with said receptacles, one of said parts moving with the receptacles, said valve-mechanism being constructed and arranged to permit the fluid to pass from said sources successively through said receptacles when the latter are advanced in their path of movement, for the purpose set forth.

11. A pasteurizing apparatus comprising, in combination, a plurality of closed receptacles supported to move in an endless path and adapted to receive the material to be pasteurized, sources of supply of fluid at different temperatures, and valve-mechanism formed of relatively movable parts communicating, respectively, with said sources of supply and with said receptacles,

one of said parts moving with said receptacles, said valve-mechanism being constructed and arranged to permit the fluid from said sources to pass successively through said receptacles when the latter are advanced in their path of movement and occupy certain predetermined positions, and to vent said receptacles successively of their contained fluid when moved into other predetermined positions.

12. A pasteurizing apparatus comprising, in combination, a plurality of closed receptacles supported to move in an endless path, sources of supply of fluid at different temperatures, and valve-mechanism formed of relatively movable parts communicating, respectively, with said sources of supply and with said receptacles, one of said parts moving with said receptacles, said valve-mechanism being constructed and arranged to permit the fluid to pass from said sources successively through said receptacles when the latter are advanced in their path of movement and occupy certain predetermined positions, to vent said receptacles successively of their contained fluid when moved into other predetermined positions, and to cause said sources of supply of fluid when in another predetermined position.

13. A pasteurizing apparatus comprising, in combination, a plurality of closed receptacles supported to move in an endless path and adapted to receive the material to be pasteurized, a plurality of tanks containing fluid at different temperatures, valve-mechanism communicating with said receptacles, and conduits communicating with said valve-mechanism and leading to and from said tanks, respectively, said valve-mechanism being constructed and arranged to pass the fluid from said tanks successively through said receptacles when the latter are advanced in their path of movement and occupy certain predetermined positions, to vent said receptacles successively of their contained fluid when moved into other predetermined positions, and return the fluid to the respective tanks from which it was drawn, for the purpose set forth.

14. A pasteurizing apparatus comprising, in combination, a plurality of closed receptacles supported to move in an endless path, a plurality of tanks containing fluid at different temperatures, valve-mechanism communicating with said receptacles, and conduits communicating with said valve-mechanism and leading to and from said tanks respectively, said valve-mechanism being constructed and arranged to pass the fluid from said tanks successively through said receptacles when the latter are advanced in their path of movement and occupy certain predetermined positions, to vent said receptacles successively of their contained fluid

when moved into other predetermined positions, to cause said receptacles to be cut off from said tanks when in another predetermined position, and to return the fluid to the respective tanks from which it was drawn.

15. A pasteurizing apparatus comprising, in combination, a plurality of closed receptacles supported to move in an endless path and adapted to receive the material to be pasteurized, a plurality of tanks containing fluid at different temperatures, valve-mechanism communicating with said receptacles, and conduits communicating with said valve-mechanism and leading to and from said tanks respectively, said valve-mechanism being constructed and arranged to pass the fluid from said tanks successively through said receptacles as they are advanced in the path of their movement and return the fluid to the respective tanks from which it was drawn, for the purpose set forth.

16. A pasteurizing apparatus comprising, in combination, a plurality of closed receptacles supported to move in a circular path and adapted to receive the material to be pasteurized, and valve-mechanisms, one of which communicates with a source of pasteurizing fluid and with one end of each receptacle, and the other of which affords communication between predetermined sets of receptacles at their other ends, said valves operating to pass fluid into certain predetermined receptacles and discharge the same through the other receptacles of the predetermined sets thereof successively, for the purpose set forth.

17. A pasteurizing apparatus comprising, in combination, a plurality of closed receptacles supported to move in a circular path and adapted to receive the material to be pasteurized, and valve-mechanisms formed of relatively movable parts containing ports, one part of each valve moving with said receptacles and the other parts thereof being stationary, said movable parts communicating, respectively, with the receptacles at their opposite ends, the ports of one of said stationary parts being connected with a source of pasteurizing fluid, and the ports of the other of said stationary parts affording communication between predetermined sets of receptacles, said valves operating, when the receptacles are intermittently advanced, to pass the fluid therethrough, for the purpose set forth.

18. A pasteurizing apparatus comprising, in combination, a plurality of closed receptacles supported to rotate in a circular path and adapted to receive the material to be pasteurized, and a pair of valves one of which communicates with a source of pasteurizing fluid and with said receptacles at one end, and the other of which affords

communication between predetermined sets of said receptacles for effecting circulation of the pasteurizing fluid through the receptacles, for the purpose set forth.

19. A pasteurizing apparatus comprising, in combination, a plurality of closed receptacles supported to move in a circular path and adapted to receive the material to be pasteurized, and a pair of valves one of which is connected with a source of pasteurizing fluid and with said receptacles at one end and forms means for controlling the supply of fluid to the receptacles, and the other of which affords communication at the other ends of the receptacles between predetermined sets thereof, said fluid-inlet-controlling valve operating to cut off the supply of fluid to said receptacles when they successively occupy a predetermined position, for the purpose set forth.

20. A pasteurizing apparatus comprising, in combination, a plurality of closed receptacles supported to move in a circular path and adapted to receive the material to be pasteurized, and a pair of valves one of which is connected with a source of pasteurizing fluid and with said receptacles at one end and forms means for controlling the supply of fluid to the receptacles, and the other of which affords communication at the other ends of the receptacles between predetermined sets thereof, said fluid-inlet-controlling valve operating to cut off the supply of fluid to said receptacles and to vent said receptacles of their contained pasteurizing fluid when they occupy certain predetermined positions.

21. A pasteurizing apparatus comprising, in combination, a plurality of closed receptacles supported to move in an endless path and adapted to receive the material to be pasteurized, and valve-mechanism formed of relatively movable parts communicating, respectively, with a source of pasteurizing fluid and with said receptacles, one of said parts moving with the receptacles, said valve-mechanism being constructed and arranged to cause the fluid to pass from said source into said receptacles when the latter are intermittently advanced in their path of movement, excepting when they successively occupy a certain predetermined position for recharging with material to be pasteurized.

22. A pasteurizing apparatus comprising, in combination, a plurality of closed receptacles supported to move in an endless path and adapted to receive the material to be pasteurized, means for intermittently operating said receptacles, and valve-mechanism formed of relatively movable parts communicating, respectively, with a source of pasteurizing fluid and with said receptacles, one of said parts moving with the receptacles, said valve-mechanism being con-

structed and arranged to pass fluid from said source into said receptacles when the latter occupy predetermined positions in their path of movement.

23. A pasteurizing apparatus comprising, in combination, a plurality of closed receptacles supported to move in an endless path and adapted to receive the material to be pasteurized, means for intermittently operating said receptacles, and valve-mechanism formed of relatively movable parts communicating, respectively, with a source of pasteurizing fluid and with said receptacles, one of said parts moving with the receptacles, said valve-mechanism being constructed and arranged to pass fluid from said source into said receptacles when the latter occupy predetermined positions in their path of movement, and vent the same when they occupy other positions, for the purpose set forth.

24. A pasteurizing apparatus comprising, in combination, a plurality of closed receptacles supported to move in an endless path and adapted to receive the material to be pasteurized, and valve-mechanism formed of relatively movable parts communicating, respectively, with a source of pasteurizing fluid and with said receptacles, one of said parts moving with the receptacles, said valve-mechanism being constructed and arranged to pass the fluid from said source into said receptacles throughout a portion of the travel of the latter and to vent the same at another point in their travel for placing them in position for recharging with material to be pasteurized.

25. A pasteurizing apparatus comprising, in combination, a plurality of closed receptacles supported to move in a circular path and adapted to receive the material to be pasteurized, and a pair of valves each formed of a stationary part and a cooperating rotatable part, said rotatable part being provided with conduits communicating with said receptacles, the said stationary part of one of said valves containing conduits adapted to be brought into registration successively with the conduits in the cooperating movable part of the valve when said receptacles are intermittently advanced in their path of movement, and the stationary part of the other of said valves being provided with ports communicating with a source of pasteurizing fluid and of a less number than the conduits in its cooperating movable part and adapted to register successively with said last referred to conduits when said receptacles are advanced, for the purpose set forth.

26. A pasteurizing apparatus comprising, in combination, a plurality of closed receptacles supported to move in a circular path and adapted to receive the material to be pasteurized, and a pair of spaced valves lo-

cated centrally of said receptacles and each
formed of a stationary part and a part ro-
tatable thereon, the said rotatable parts of
the valves being connected by conduits with
5 said receptacles at their opposite ends and
spaced in said rotatable parts equidistantly
in a circular series, the stationary part of
one of said valves containing cross-conduits
adapted to afford communication between
10 diametrically-disposed receptacles, and the
stationary part of the other of said valves

containing ports communicating with a
source of pasteurizing fluid, said last re-
ferred to ports being of less number than
the conduits coöperating therewith and 15
adapted to successively register with the
latter, for the purpose set forth.

AUGUST TIESSE.

In presence of—

F. L. BROWNE,
GEO. H. SNYDER.