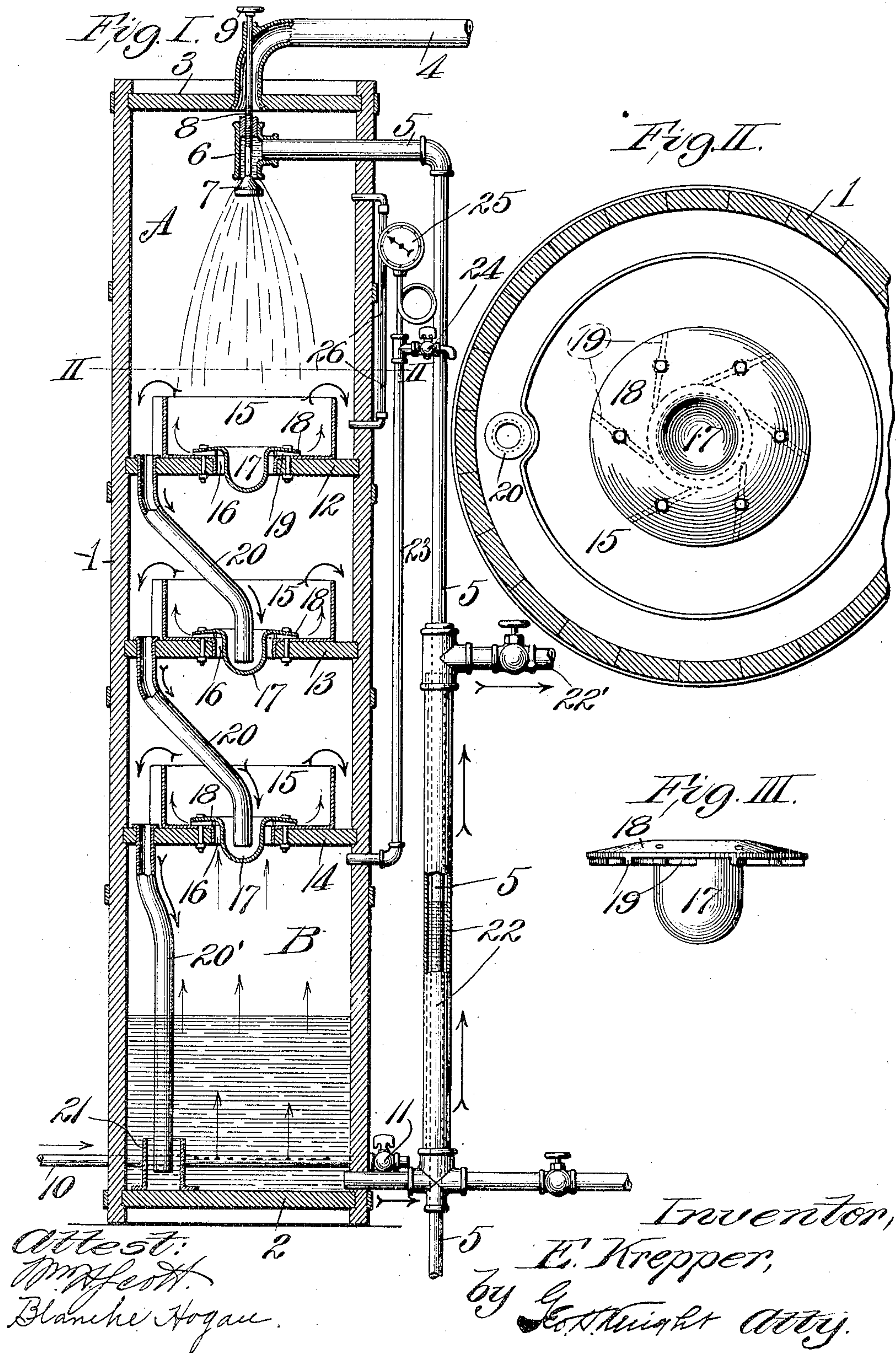


No. 843,217.

PATENTED FEB. 5, 1907.

E. KREPPER.
CONTINUOUS STILL.
APPLICATION FILED SEPT. 17, 1906.



UNITED STATES PATENT OFFICE.

EMIL KREPPER, OF ST. LOUIS, MISSOURI.

CONTINUOUS STILL.

No. 843,217.

Specification of Letters Patent.

Patented Feb. 5, 1907.

Application filed September 17, 1906. Serial No. 334,880.

To all whom it may concern:

Be it known that I, EMIL KREPPER, a citizen of the United States of America, residing in the city of St. Louis in the State of Missouri, have invented certain new and useful Improvements in Continuous Stills, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to a still for use in recovering the volatile matter, such as alcohol, from various liquids when subjected to the action of heat; and it has for its object to furnish a still of this character which combines simplicity and an efficiency of operation.

Figure I is in part a vertical section taken through my still and in part a side elevation. Fig. II is an enlarged cross-section taken on line II II, Fig. I. Fig. III is an elevation of one of the trap-cups of the still.

1 designates the shell or casing of my still, which is provided with a bottom 2 and a top 3. Within the upper end of the shell is a receiving-chamber A and within the lower end of the shell is a residue-chamber B.

4 designates a vapor-conducting pipe leading from the receiving-chamber A and preferably attached to the top 3 of the still-shell. (See Fig. I.)

5 designates a feed-pipe through which the liquid that is to be introduced into the still for distillation is conducted into the receiving-chamber A. This feed-pipe preferably extends vertically alongside of the shell 1 and then horizontally into said receiving-chamber.

6 is a hollow head attached to the discharge end of the feed-pipe 5 within the receiving-chamber and open at its lower end.

7 is a spreader-valve, preferably of conical form, which is located at the lower or outlet end of the head 6 and by which the liquid is spread into a finely-divided sheet or spray as it emerges from the head 6. The valve 7 is supported by a valve-rod 8, that extends to the exterior of the still and preferably passes through the vapor-conducting pipe 4 and is provided with a handle 9, by which the valve may be adjusted relatively to the outlet of the head 6.

10 designates a steam-conducting pipe that leads into the residue-chamber B and is finely perforated within said chamber for the escape of steam into the chamber. This steam-

conducting pipe preferably extends interiorly through the shell of the still and at its free end is supplied with a blow-off valve 11, that may be opened for the purpose of blowing off steam in cleaning out said pipe and the residue-chamber.

12, 13, and 14 designate shelves mounted at intervals within the still-shell and each provided with a central orifice.

15 are pans mounted on the shelves 12, 13, and 14 and having downwardly-extending central annular flanges 16, that are seated in the central orifices of said shelves. The vertical walls of the pans are arranged concentric with the shell of the still, thereby providing troughs between said walls and shell above each shelf.

17 designates trap-cups seated within the orifices in the shelves 12, 13, and 14 and arranged concentric with the flanges of the pans 15 or the walls of said orifices, a sufficient space being left between the depending portions of the cups and the flanges or orifice-walls to permit the upward passage of steam between said members. Each of the cups is provided at its upper end with a rim 18, which projects over the bottom of the corresponding pan 15 or the shelf on which said pan is seated, the rim of each pan being preferably inclined outwardly and downwardly and being slightly elevated above the bottom of the pan to provide a passage-way for the ascension of steam into said pan. Beneath each cup-rim is a plurality of tangentially-arranged vanes 19, that serve to direct the steam tangentially into the pans for the purpose of causing a swirling motion of the liquid introduced into the still and from which distillation is effected.

20 designates dropping-pipes leading from the troughs around the uppermost pans 15 of the still to the trap-cups, and 20' is a dropping-pipe leading from the trough above the lowermost shelf 14 into a trap-basin 21, that is located in the residue-chamber B.

22 is an upright outlet-pipe leading from the residue-chamber B, this pipe being extended above the upper end of said residue-chamber. The outlet-pipe is of sufficient diameter to permit the passage therethrough of the feed-pipe 5 with a sufficient space around said conducting-pipe for the flow of residue through said outlet-pipe. The object in extending the feed-pipe through the outlet-pipe is to provide for the heating of the liquid from which distillation is to be effected be-

fore such liquid enters the receiving-chamber of the still.

23 is a vertical test-pipe leading from the residue-chamber B and provided with a cock

5 24. This test-pipe is designed for service in testing the residue in the residue-chamber B, and the cock is located at a sufficient elevation to permit of alcoholic vapor (if such vapor is present in the residue-chamber) being determined, and the test is made possible
10 due to the watery parts of the liquid ascending in said test-pipe condensing and the alcoholic parts being easily detected by the sense of smell.

15 25 is a gage attached to the test-pipe and by which the degree of pressure of steam in the residue-chamber B is constantly indicated.

20 26 is a gage-tube that has communication with the receiving-chamber A and having utility of furnishing indication in the event of the passage-way in the still becoming choked.

In the practical use of my still the liquid
25 to be treated therein enters the receiving-chamber A through the feed-pipe 5 and is discharged over the valve 7 in a spray to descend into the topmost pan 15. At the same time steam enters the residue-chamber
30 B through the steam-pipe 10 and ascends through the central orifice in the shelves 14, 13, and 12, to escape into the pans 15 between the bottoms of said pans and the surmounting rims of the trap-cups 17. This
35 steam enters the pans in tangential directions and while heating the liquid therein acts to impart a swirling motion to said liquid, as a result of which the heated or boiling liquid is caused to overflow the walls of the pans in
40 a foaming condition. Due to the heating of the liquid and the agitation thereof by the steam, the volatile matters in the liquid are disseminated therefrom to rise from the pans and escape from the still through the vapor-
45 conducting pipe 4. It is of course to be understood that the vapor rising from the liquid after it has entered the lowermost pan 15 rises with the steam and in the same course through the surmounting pan or pans before
50 finding escape into the vapor-conducting pipe. The liquid after being discharged from each upper pan 15 into the trough surrounding the pan flows downwardly through the drop-pipe communicating with said
55 trough and enters the trap-cup, into which said drop-pipe leads in order that the liquid may be again subjected to the action of the steam for the dissemination of the volatile vapor that may still remain in said liquid
60 after it has been treated in one or more of the upper pans 15. After the liquid overflows the lowermost pan 15 into the trough surrounding it it is discharged into the residue-chamber B through the drop-pipe 20', that
65 extends into the trap-basin 21, which being

constantly full of liquid has the office of preventing the passage of steam in an upward direction through said pipe and into the lowermost chamber above the bottom shelf 14. There is a constant pressure of steam in the
70 residue-chamber B, and consequently this steam acts against the liquid in said chamber with a result of maintaining the liquid or residue in the outlet-pipe 22 at a greater elevation than the level of said liquid in said
75 chamber. As a consequence when the liquid in said chamber reaches a level near the top of the chamber the liquid in the outlet-pipe is caused to overflow therefrom into the horizontal extension 22' of the pipe. As a
80 result a siphonic action is established in the outlet-pipe and the residue is drained automatically from the residue-chamber to exhaust or partially exhaust said chamber and permit the continued discharge of residue
85 therein without such residue rising into the chambers occupied by the pans 15 and in which the distillation takes place.

While I have shown and described my still as constructed with the shelves 12, 13, 90 and 14 surmounted by pans 15, it is obvious that the same result or action would be secured if the shelves were surmounted only by upwardly-extending rims in lieu of pans, and therefore wish it to be understood that
95 in specifying pans I do not intend to limit myself to the use of the parts as of pan shape. In this connection it will of course be understood that the openings in the shelves through which the steam passes must
100 of necessity be provided; but it is unessential whether the upwardly-extending portions of the pans or rims have horizontal portions extending to said openings.

I claim—

1. In a still, the combination of a shell, a series of shelves mounted within said shell, pans seated on said shelves and having openings in the bottoms thereof, trap-cups located in the bottom openings of said pans, liquid-
110 conducting means leading from one pan-chamber to a trap-cup in a lower pan-chamber, means for conducting a heating medium into the lower portion of said shell, and means for feeding the liquid to be treated
115 into the upper portion of said shell, substantially as set forth.

2. In a still, the combination of a shell, a series of shelves mounted within said shell, pans mounted on said shelves and having
120 openings in the bottoms thereof, trap-cups located in the bottom openings of said pans and having rims projecting over the bottoms of the pans, liquid-conducting means leading from one pan-chamber to a trap-cup in a
125 lower pan-chamber, means for conducting a heating medium into the lower portion of said shell, and means for feeding the liquid to be treated into the upper portion of said shell, substantially as set forth.

3. In a still, the combination of a shell, a series of shelves mounted in said shell, pans seated on said shelves and having openings in the bottoms thereof, trap-cups located in the bottom openings of said pans and having outwardly-extending and downwardly-inclined rims projecting over the bottoms of said pans, liquid-conducting means leading from one pan-chamber to a trap-cup in a lower pan-chamber, means for conducting a heating medium into the lower part of said shell, and means for feeding the liquid to be treated in the upper part of said shell, substantially as set forth.

4. In a still, the combination of a shell, a series of shelves mounted within said shell, pans seated on said shelves and having openings in the bottoms thereof, trap-cups located in the openings in the bottoms of said pans and having rims extending over the bottoms of the pans, tangentially-arranged vanes located between the bottoms of said pans and said trap-cup rims, means for conducting liquid leading from one pan-chamber to a trap-cup in a lower pan-chamber, means for conducting heating medium into the lower portion of said shell, and means for feeding the liquid to be treated into the upper portion of said shell, substantially as set forth.

5. In a still, the combination of a shell, a series of shelves mounted within said shell, pans seated on said shelves and having openings in the bottoms thereof, trap-cups located in the bottom openings of said pans, drop-pipes extending downwardly from a position

exterior of an upper pan to a trap-cup associated with a lower pan, means for conducting a heating medium into the lower portion of said shell, and means for feeding the liquid to be treated into the upper portion of said shell, substantially as set forth.

6. In a still, the combination of a shell, a series of shelves mounted within said shell, pans seated on said shelves and having openings in the bottoms thereof, trap-cups located in the bottom openings of said pans, liquid-conducting means leading from one pan-chamber to the trap-cup of a lower pan-chamber, a drop-pipe leading downwardly from a position exterior of the lowermost of said pans, a trap-basin into which said drop-pipe leads, means for conducting heating medium into the lower end of said shell, and means for feeding liquid to be treated to the upper end of said shell, substantially as set forth.

7. A still comprising a shell, a series of shelves each having an orifice, walls surrounding the orifices, trap-cups located in the orifices and spaced from the shelves and said orifices, liquid-conducting means leading from the shelves to the trap-cups, means for conducting a heating medium into the lower part of said shell, and means for feeding the liquid to be treated into the upper part of said shell.

EMIL KREPPER.

In presence of—

NELLIE V. ALEXANDER,
BLANCHE HOGAN.