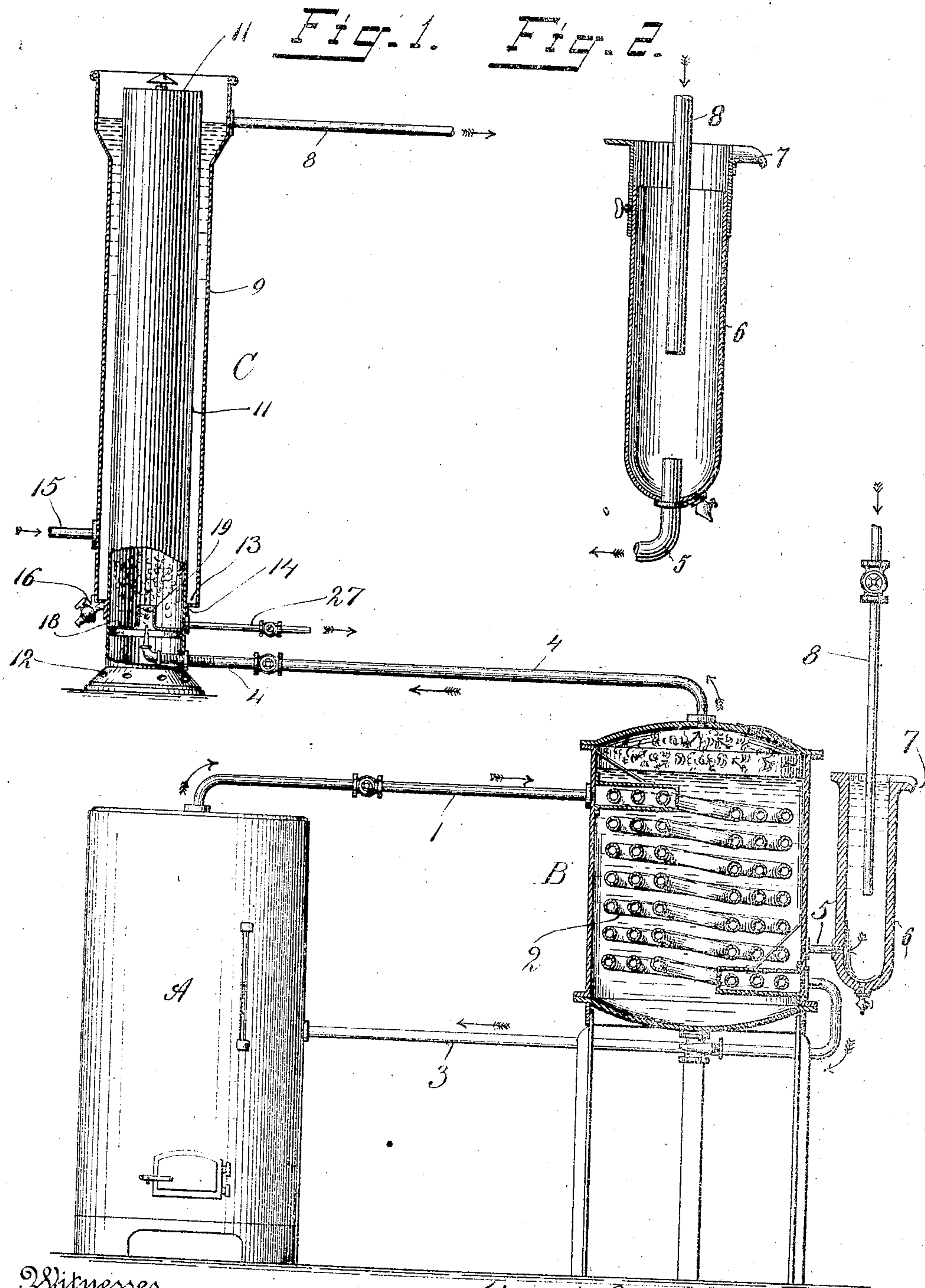


No. 829,756.

PATENTED AUG. 28, 1906.

W. H. BARTHOLOMEW.
DISTILLING APPARATUS.
APPLICATION FILED MAY 8, 1905.



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DISTILLING APPARATUS.

No. 829,758

Specification of Letters Patent.

Patented Aug. 28, 1906.

Application filed May 8, 1905. Serial No. 259,361.

To all whom it may concern:

Be it known that I, WALTER H. BARTHOLOMEW, of East Orange, county of Essex, and State of New Jersey, have invented certain new and useful Improvements in Distilling Apparatus, of which the following is a full, clear, and exact specification, reference being had to the accompanying drawings, wherein—

Figure 1 is an elevation partly-sectional view of a water-distilling apparatus embodying my invention, and Fig. 2 an elevation partly-sectional view of a modified construction of the receptacle for the still.

My invention, set forth in this application and in my application filed May 8, 1905, Serial No. 259,362, relates to distilling apparatuses, more particularly such as are used for distilling water in large quantities; and the invention set forth and claimed herein consists more particularly of the hereinafter-described improvements in the construction of such distilling apparatus and in the combination of its parts as set forth in the claims.

I have found by experiments and observation of the process of distilling that a large proportion of the substances suspended in the water, including those held in solution, are precipitated, while others rise to the surface, when the temperature of the water is changed. This discovery is utilized in my improved apparatus by devising means for such changing the temperature of the water to be distilled and for removing from it such substances before it is fed into the still, and thus largely eliminating impurities from the water to be distilled before it is fed into the still or evaporator. These devices are so combined in my improved apparatus with the other essential parts of such an apparatus that the operations are carried on continuously and successively.

The apparatus embodying my invention comprises a steam-boiler A, an evaporator or still B, a feed-water receptacle 6 for the still, one or more condensers C, the conduits, and the auxiliary devices used in combination therewith, as more fully explained farther on. The steam-boiler A may be of any suitable type, its object being to generate steam, which is conducted by pipe 1 into the still B, where it passes through the coil 2 and leaves the still again through pipe 3, returning to

the boiler. The still B is a closed vessel of any suitable type, wherein a steam-coil 2 is located and connected with the conduits 1 and 3, as explained above. The dome of the still B connects with the vapor-conduit 4, through which the vapors pass from the still into the condenser. The condenser C used in my improved distilling apparatus forms the subject-matter of my application Serial No. 259,361, as referred to above, and comprises a comparatively long (high) cylindrical vessel 11 with a suitably-enlarged flared base 12 and with the concentrically-superimposed jacket 9, water-tightly secured to the hull of the interior vessel 11 at 14. An inlet-pipe 15 is tapped into the jacket some distance above the bottom thereof and is connected to a pump or other source of supply of water. In the bottom 13 of the jacket a discharge-pipe 16, provided with a stop-cock, is set. This pipe 16 is used for discharge of sediments and precipitated substances contained in the water. The upper end of jacket 9 is open, and pipe 8 connects with it at or below the level of its upper rim, conveying the partly-heated and partly-purified water into the receptacle 6, from where it is fed into the still. The construction of this receptacle 6 and its connections with the feed-pipe 5 and the pipe 8 are devised with the same object in view to facilitate a further partial purification of the water to be distilled. Pipe 8 extends some distance into the receptacle 6, and the latter is provided with an overflow. The consumption of water fed into the still is considerably less than the supply flowing into receptacle 6 through pipe 8, and thus whatever impurities may be in the water floating on its surface by reason of the heating of the water in jacket 9 or otherwise are carried off by the overflow.

Feed-pipe 5, which feeds the water from the receptacle 6 to the still, is shown in Fig. 1 tapped into the side of receptacle 6 at a distance from the bottom of the receptacle. As shown in Fig. 2, the pipe 5 projects upwardly through the bottom of receptacle 6 to a distance above the bottom of the receptacle. Thereby a receptacle is created between the aperture of pipe 5 and the bottom of the stand-pipe 6 for the accumulation of sediments and precipitated substances. There

the sediment is not disturbed and may be removed by means of a discharge-pipe, (like the pipe 16,) which is preferable in large stills, or by removing and emptying the receptacle 5 6 from time to time. By these arrangements the feed-water for the still is to a large degree purified, and its temperature is raised, so that thereby the consumption of steam required for evaporating it in the still is greatly reduced. The overflow 7 of stand-pipe 6 may be made adjustable by superimposing a sleeve provided with an outflow upon the stand-pipe and by providing means for fixing the sleeve in adjusted position, as shown in Fig. 2.

15 Some distance below where jacket 9 terminates a circular flange 18 is secured interiorly to the cylindrical vessel 11 and deflected upwardly, thus forming a receptacle for the distilled water in the bottom of the condensing-chamber. Underneath the 20 jacket 9 and above the flange 18 an outlet-pipe 27 is tapped in the hull of the condenser for withdrawing the condensed water from the condenser. This pipe may be provided with a cock or may be connected to a 25 conduit conveying the distillate wherever it is required. The vapors from the still enter the condenser through the central aperture 19, formed by the upwardly-deflected flange 30 18. For this purpose the vapor-conduit 4 from the still terminates some distance below the edge of flange 18 and concentrically with the opening 19. Though I have shown and described this particular form of condenser, its use is not essential for the objects of the invention herein set forth, and which consists, as explained, in the devising and arrangement of parts of the apparatus whereby the water to be distilled is partially purified 35 and heated before being fed into the still.

The above-described improvements in construction of a water-distilling apparatus are highly advantageous, particularly in apparatus intended for distilling of sea-water or 45 other water containing undesirable substances in solution or in suspension. By these arrangements a large proportion of impurities to be removed from the water by distillation is dispersed from the water before it enters the still, the process of distillation considerably reduced, and the apparatus rendered capable to be operated continuously for a much longer period of time before any cleaning of the still is required.

55 I claim as my invention—

1. A distilling apparatus, comprising a still, and a condenser; a vapor-conduit connecting the still with the condenser; a jacket set upon the condenser; an inlet-pipe tapped 60 in the jacket above its bottom and an overflow-conduit communicating with the interior of the jacket at its upper end; a discharge-pipe set in the bottom of the jacket; a receptacle for the overflow of the jacket; an over-

flow-outlet on the receptacle to carry off impurities floating on the surface of the water 55 in the receptacle, and an outlet-pipe with a stop-cock set in its bottom; a feed-pipe for the still, set in the receptacle and projecting above its bottom; means for evaporating the liquid fed in the still and means for withdrawing the condensed product of distillation from the condenser. 70

2. In combination with a still, a condenser, a vapor-conduit connecting said still and condenser, a jacket surrounding said condenser, an inlet let into said jacket adjacent its lower end, an overflow-conduit let into said jacket adjacent its upper end, a receptacle communicating with said overflow-conduit, said receptacle embodying a pair of 80 telescoping members, means for securing said members in adjusted position, the upper of said members having its top formed with an overflow to carry off impurities floating on the surface of the water in the receptacle, 85 a feed-pipe from said still into the receptacle to a point above the bottom of said receptacle, to form a chamber for accumulation of sediments below the mouth of the feed-pipe, 90 and means in the bottom of said receptacle to enable sediment to be discharged therefrom.

3. In a water-distilling apparatus, comprising a still, condenser, a water-jacket, surrounding the condenser and a conduit connecting the jacket of the condenser with a source of supply of water, of a feed-water receptacle for the still, said receptacle having its upper end formed into an overflow to 95 carry off impurities floating on the surface of the water in the receptacle; a conduit, tapped into the receptacle above the bottom thereof to form a chamber for accumulation of sediments below the mouth of the conduit, and 100 connecting the receptacle with the still; an outlet-pipe provided with a stop-cock in the bottom of the receptacle and a feed-water conduit from the top of the water-jacket of the condenser to a point within the feed-water receptacle for the still. 105

4. In combination with a still and a condenser in communication with one another, a jacket surrounding said condenser, a receptacle embodying a pair of adjustable members, a feed-pipe leading from said still into the lower of said members, the top of the upper of said members being formed with an overflow to carry off impurities floating on the surface of the water in the receptacle, and 115 a conduit leading from a point adjacent the top of the jacket to a point within said receptacle. 120

5. In combination with a still and a condenser in communication with one another, of a jacket, surrounding the condenser, a receptacle consisting of a pair of members, a feed-pipe from said still into the lower of 125

5 said members and terminating some distance above the bottom of the receptacle, to form, in conjunction therewith, a chamber for the accumulation of sediments; the upper member of the receptacle having telescopic relation with the lower member and adjustably supported thereon; a conduit from the jacket of the condenser into the receptacle,

terminating below the overflow and above the bottom thereof, and means for removing 10 sediments from the bottom of the receptacle.

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