

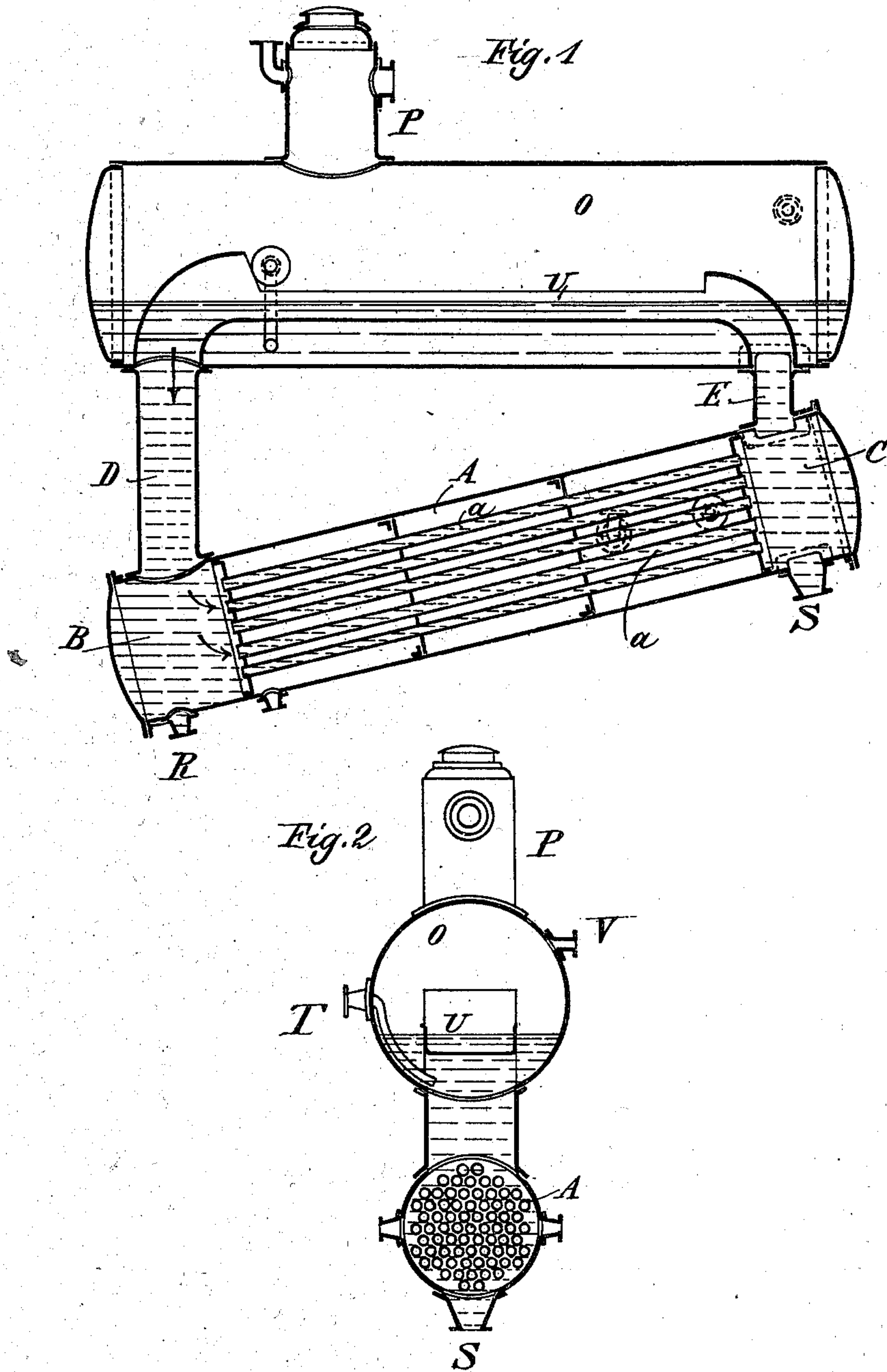
No. 709,297.

Patented Sept. 16, 1902.

W. BENDER.
EVAPORATOR.

(Application filed June 11, 1901.,

(No Model.)



Witnesses:
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UNITED STATES PATENT OFFICE.

WILHELM BENDER, OF DÜREN, GERMANY, ASSIGNOR TO THE FIRM OF
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EVAPORATOR.

SPECIFICATION forming part of Letters Patent No. 709,297, dated September 16, 1902.

Application filed June 11, 1901. Serial No. 64,195. (No model.)

To all whom it may concern:

Be it known that I, WILHELM BENDER, a subject of the King of Prussia, German Emperor, and a resident of Düren, in the Province of the Rhine, German Empire, have invented certain new and useful Improvements in Evaporators, of which the following is an exact specification.

My invention relates to improvements in evaporators for inspissating fluids, especially thickly-liquid fluids, as pitch, thickly-liquid lyes, molten resin, or other substances which are fluid when heated, but stiff or doughy when cold. In the evaporation of such substances a great disadvantage consists in the tubes of the evaporator easily being choked up by the formation of crusts within the tubes or by the falling to the bottom of solid substances contained in the fluids. This disadvantage is done away with by the object of the present invention, which is illustrated in the accompanying drawings, in which—

Figure 1 is a longitudinal section of the evaporator. Fig. 2 is a cross-section of the same.

A plurality of tubes *a* is surrounded by a steam-jacket A. The tubes *a* are connected on one side with a chamber B, on the other side with a chamber C, which chambers are connected with an upper cylindrical reservoir O by means of the upright tubes D and E. The upright tubes D and E are connected to each other within the cylindrical reservoir O by means of a U-shaped trough-like channel U. As may be seen from the drawings, the tubes *a* have an inclined situation. The cylindrical reservoir O is provided with a dome P for leading off the steam or other gases resulting from the evaporation. The substance

to be evaporated can be brought into and out of the apparatus at R or S, while the steam is led off or led in at T and V.

The effect of the apparatus is as follows: The pitch or the like substance contained within the tubes *a*, the chambers B and C, the upright tubes D and E, and the channel U is heated within the tubes *a* by the steam-jacket surrounding these tubes. By the inclined situation of the tubes *a* a circulation of the substance to be vaporized takes place, by which circulation the formation of crusts within the tubes and the choking up of the same are perfectly avoided. The vapors which gather in the cylindrical boiler O may be drawn off at the dome P in any convenient manner.

Having thus fully described the nature of my said invention, what I desire to secure by Letters Patent of the United States is—

In evaporators the combination with a plurality of tubes situated in an inclined position, a steam-jacket surrounding these tubes, chambers connected by means of the tubes and upright tubes connecting these chambers with a cylindrical reservoir, a cylindrical reservoir for gathering the vapors and a U-shaped trough-like channel open on its upper side, situated within the reservoir and connecting the upper ends of the upright tubes, substantially as described and for the purpose set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILHELM BENDER.

Witnesses:

H. QUADFLIEZ,
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