

No. 898,147.

PATENTED SEPT. 8, 1908.

E. VON SEEMEN.
EVAPORATOR.

APPLICATION FILED AUG. 21, 1906.

Fig. 1

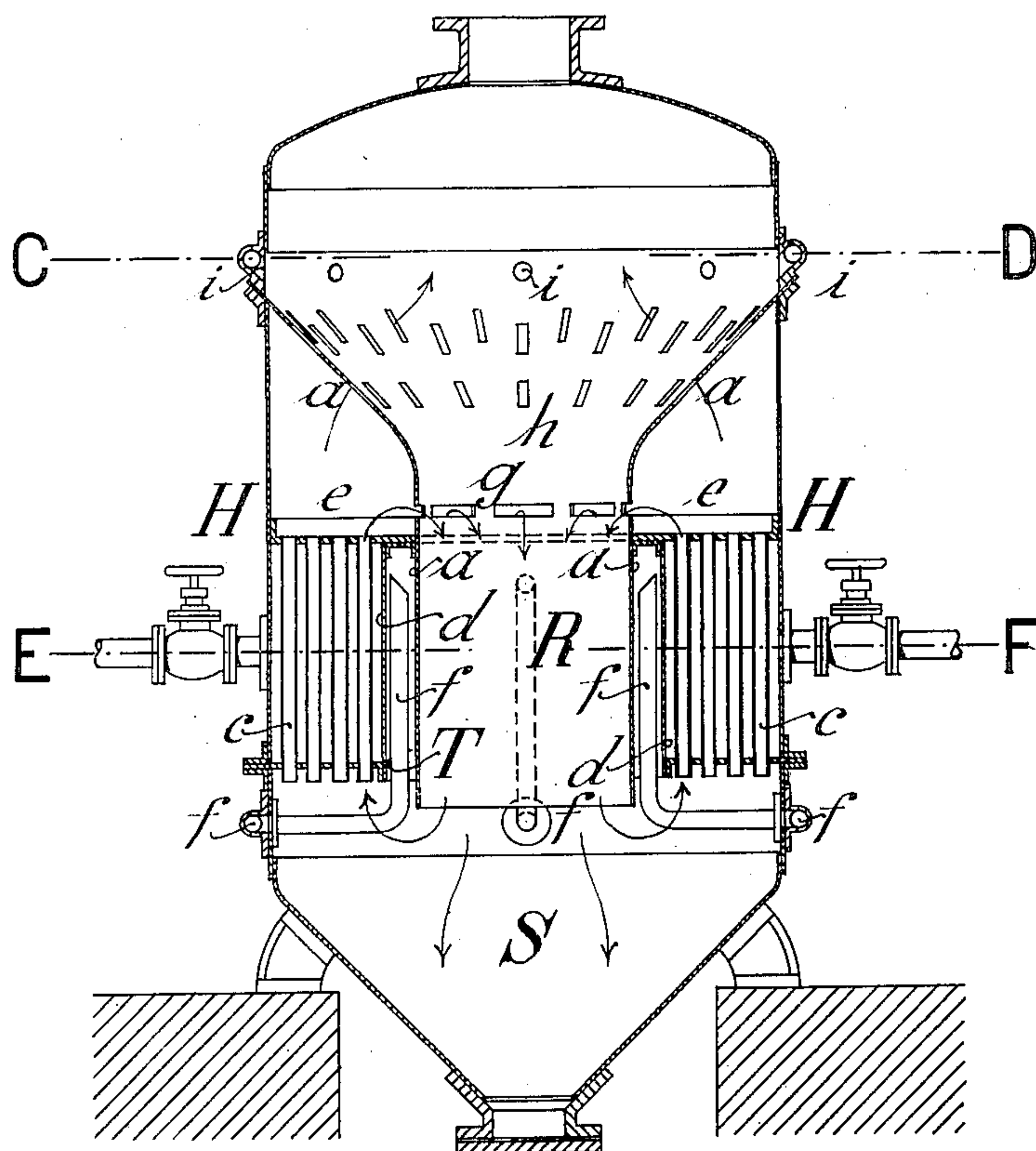
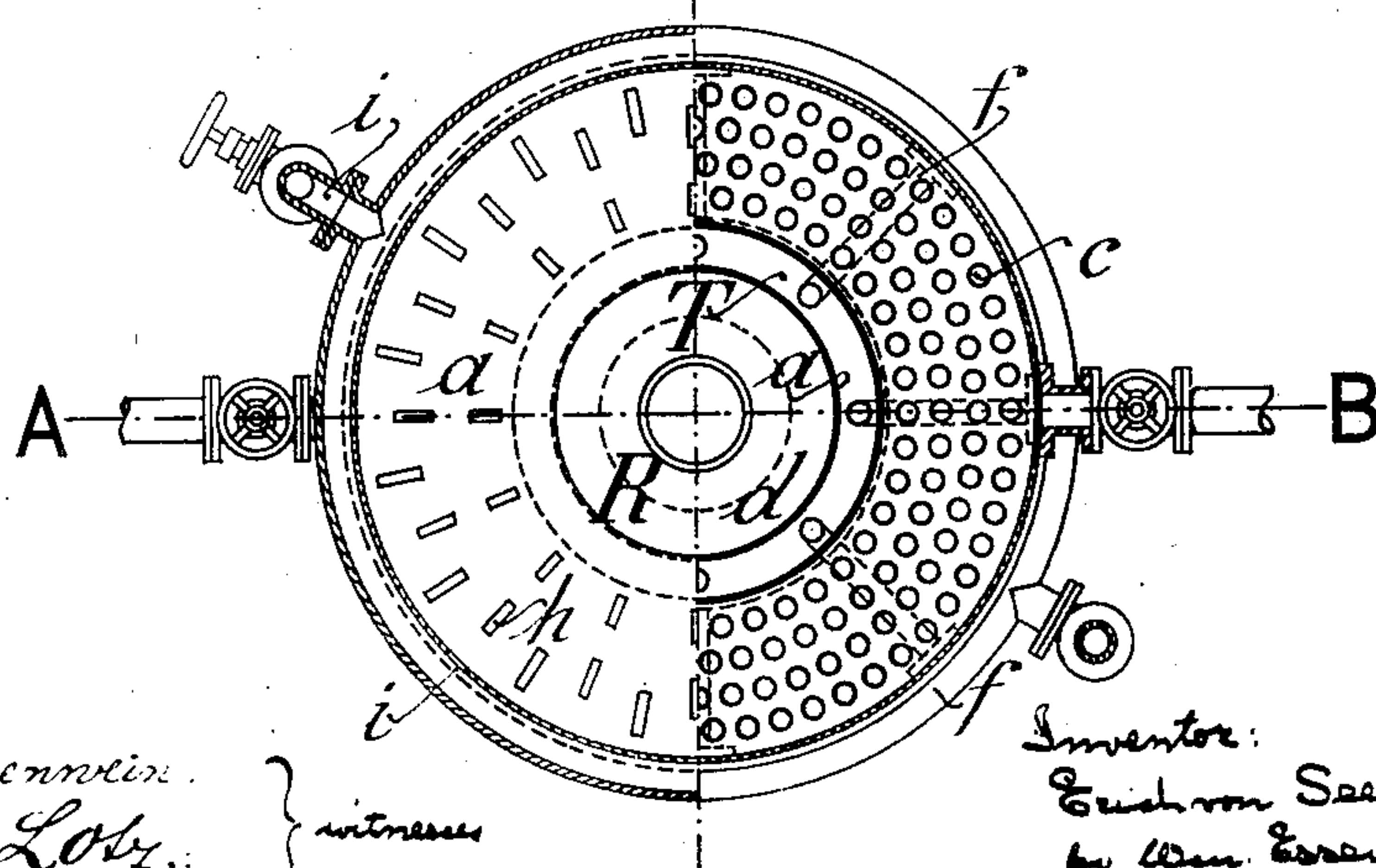


Fig. 2



Mar. Esserwein.
Adolf Lotz. } witnesses

Inventor:
Erich von Seemen
by Wm. Esserwein
attorney

UNITED STATES PATENT OFFICE.

ERICH VON SEEMEN, OF RHEINFELDEN, SWITZERLAND.

EVAPORATOR.

No. 898,147.

Specification of Letters Patent.

Patented Sept. 8, 1908.

Application filed August 21, 1906. Serial No. 331,443.

To all whom it may concern:

Be it known that I, ERICH VON SEEMEN, a citizen of German Empire, residing at Rheinfelden, Switzerland, have invented new and useful Improvements in Evaporators, of which the following is a specification.

My invention relates to improvements in evaporators of the class which may be used for the condensation of fluid substances or for crystallization, and its objects are, first, to provide in an evaporator of the kind referred to a central chamber which is not in close contact with the heater drum, receives the boiling fluid ascending in the tubes of the latter and permits a settling of the inspissated fluid or crystals in the bottom compartment; second, to provide an intermediate compartment between the said central chamber and heater drum, and, third, to provide for the controllable supply of the said intermediate compartment with fresh fluid to regulate the temperature therein.

I attain my objects by the construction illustrated on the drawing herewith in which Figure 1 is a vertical section through an evaporator as herein described and Fig. 2 a horizontal transverse section divided into two halves, one half being on the line C—D of Fig. 1 and the other on the line E—F of the same figure, the section shown in Fig. 1 being on the line A—B of Fig. 2.

My drawing shows a cylindric apparatus comprising a central chamber R formed by a hollow cylinder *a* headed by a conical enlargement resembling a funnel, the upper rim of which is secured all around in the shell of the apparatus. Concentric but not close to the said cylinder *a* there is provided the heater drum H comprising an inner circular wall *d* and extending to the shell of the apparatus which forms its circumference. In the said heater drum there are contained vertical pipes *c* set in the bottom and top plates which are perforated for the purpose. The perforated top-plate *e* extends from the shell of the apparatus direct to the circumference of the cylinder *a*, thus covering not only the heater drum, but also the space between the said drum and the central cylinder and by this way forming an annular intermediate compartment T which is closed on top and open at the bottom. Beneath the said cylinder *a*, compartment T and heater drum H is the bottom compartment S adapted for the collection therein of the inspissated fluid and for the settlement of the crystals.

Into the compartment T are conducted pipes *f* adapted to convey a controllable supply of fresh fluid into the same while another series of supply pipes *i* ends in the rim of the aforesaid funnel and is likewise adapted to supply fresh fluid. In the upper portion of the funnel are further provided slots *h* for the passage of the vapors and in the central cylinder, just above the upper plate *e* of the heater drum, is another series of slots *g* adapted for the passage of fluid coming from the pipes *c* in the heater drum. The compartment T being as described closed on top and open at the bottom is not in the way of the circulation going on in the evaporator and extending from the heater pipes *c* into the central compartment R, going down within the same and upwards again into the said heater pipes *c*, but forms a kind of insulating space between the said central compartment and heater drum, the temperature within the compartment T being regulated by opening the conduits *f* to admit so much fresh fluid as may be required to reduce the temperature and, consequently, at the same time the evaporation in the central chamber, and by closing the conduits again when the process in the central chamber becomes liable to be impaired by too much cooling. The fresh fluid received through the pipes *f* gradually removes any of the old fluid which may still be present within the compartment, such fluid on being removed and after leaving the compartment joining slowly in the circulation above referred to and also prevents the crustation of matter on the comparatively cool cylinder. The heat radiated from the heater-drum H which would act upon the central chamber R is by the regulation of the temperature within the compartment T to a certain extent also regulated and is reduced so much that the evaporation goes on smoothly within the cylinder *a* while immediately above the heater drum the process is rather turbulent. The boiling fluid passed through the pipes *c* goes over into the central compartment R by passing the aforesaid slots *g* in the central chamber except that any foam bubbles and boiling waves remain behind. The regulated temperature in the compartment T causes a division of the fluid in the central chamber, those parts which are sufficiently inspissated and are therefore heavier going down and collecting in the bottom compartment S, while those parts which are not sufficiently condensed and are there-

fore lighter are sucked up again by the pipes *c* to be reëvaporated. The vapors escape through the slots *h* in the funnel, a crustation in the funnel sides being prevented by admitting through the conduits *i* fresh fluid washing over the said funnel sides.

I am aware that evaporators have been patented showing features which might be confounded with features in my own device. In this respect I refer to certain slots contained in an evaporator described in United States Patent No. 762,915, dated June 22, 1904, which slots are, however, provided beneath the fluid-level which would not do in my construction in which the traveling speed in the central compartment *R* would become too rapid and liable to entirely defeat the advantages of my invention.

What I claim is:

20 In an evaporator for the condensation of fluid substance and crystallization comprising the combination with an evaporator-shell of a cylinder forming a central chamber ending on top in a funnel provided with slots in

its upper portion, a heater-drum containing vertical pipes and surrounding concentrically the said cylinder, an annular space being left between the said cylinder and heater-drum and the top plate of the latter extending from the shell of the evaporator to the circumference of the said cylinder, thus covering the said annular space and making it an intermediate compartment closed on top and open at the bottom, feed pipes conducted into the said intermediate compartment and adapted to supply it with fresh fluid, and similar pipes opening into the rim of the funnel, also adapted to admit fresh fluid, the aforesaid cylinder *a* having slots close above the top-end of the heater, all substantially as described.

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

ERICH VON SEEMEN.

Witnesses:

GEO. GIFFORD,
ANDREW HEER.