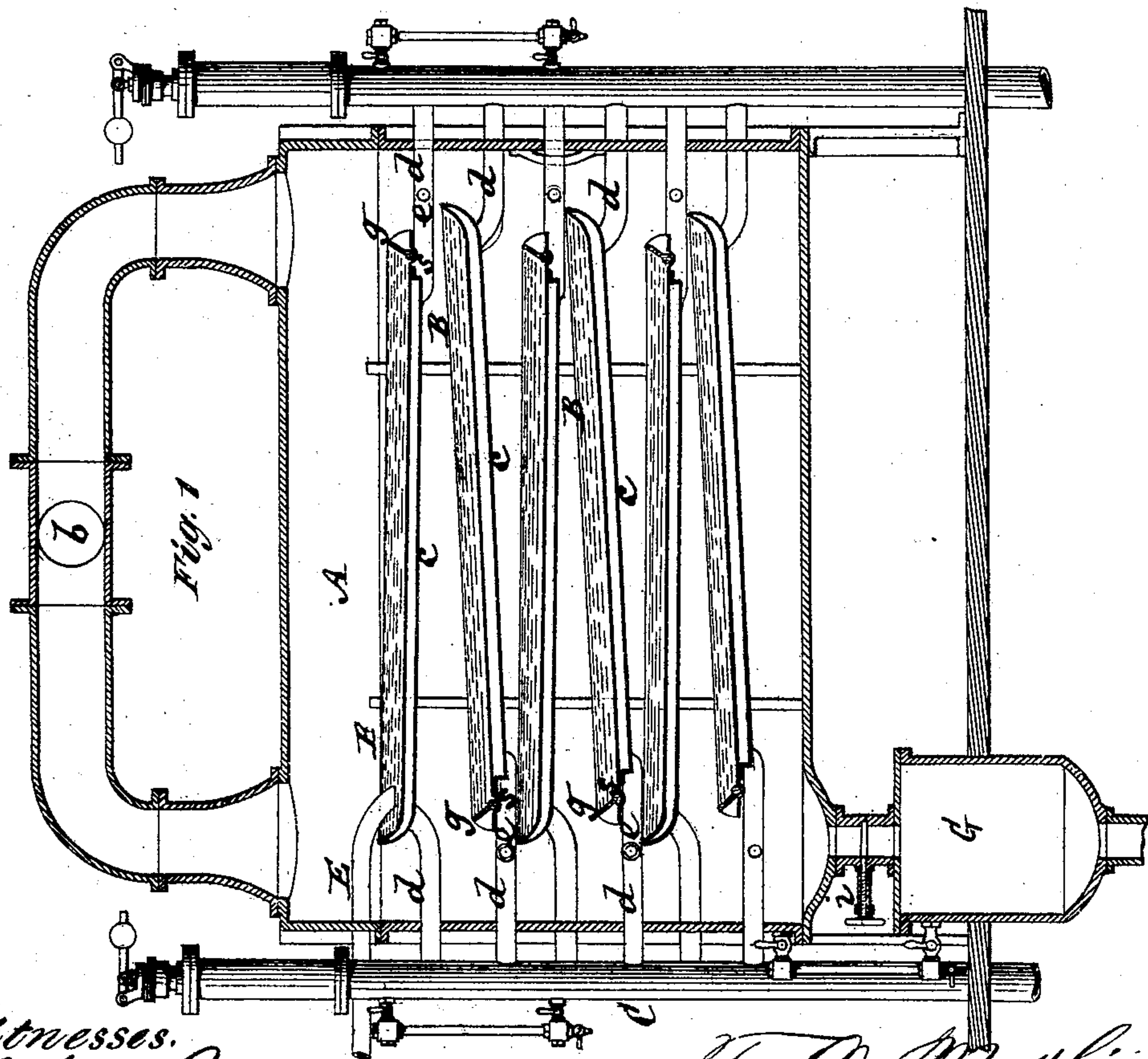
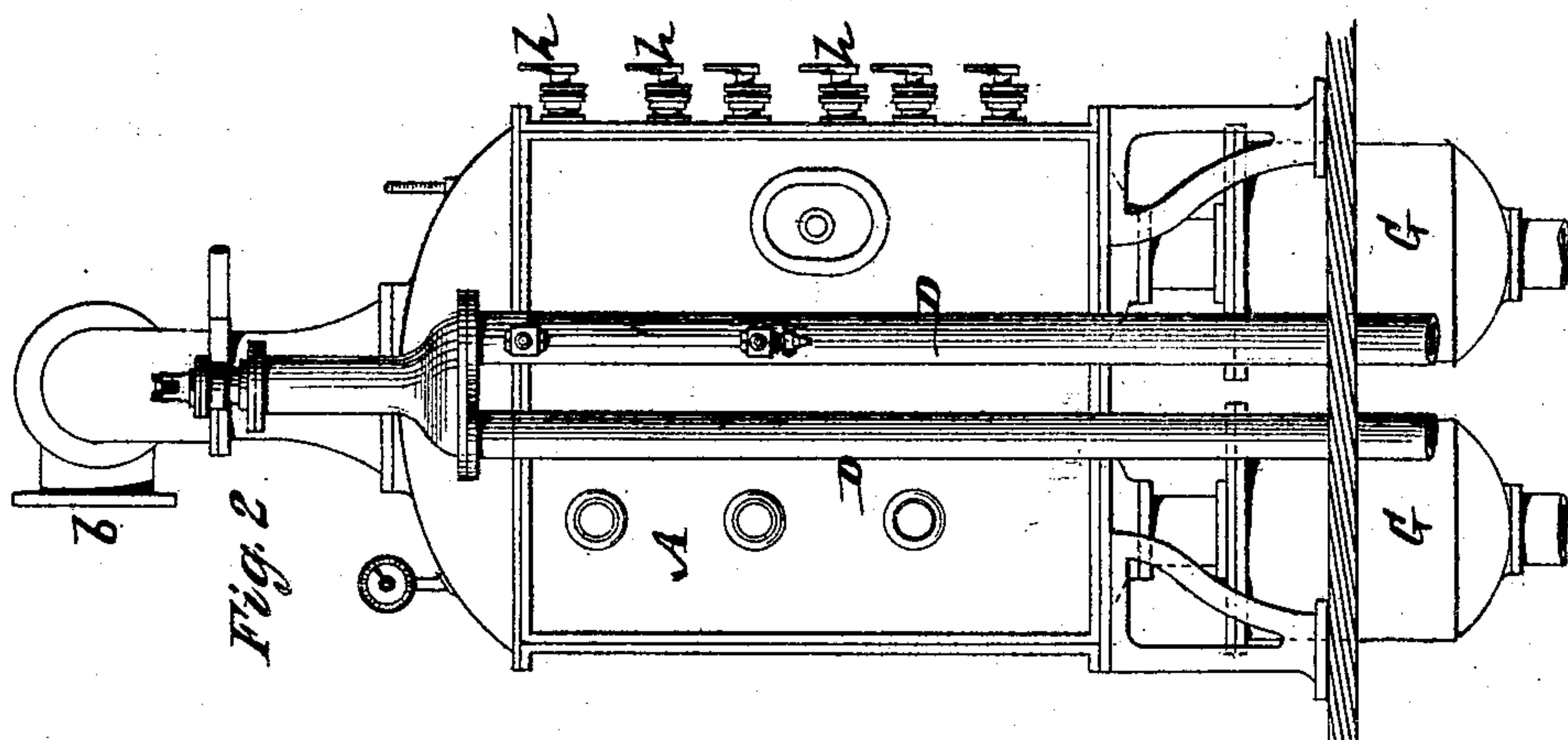


F. O. MATTHIESSEN.  
Evaporators for Syrups and other Liquids in  
Vacuo.

No. 147,149.

Patented Feb. 3, 1874.



Witnesses.  
Michael Ryan  
Fred Wagner

F. O. Matthiessen  
by his Attorneys  
Brown & Allen



# UNITED STATES PATENT OFFICE.

FRANZ O. MATTHIESSEN, OF NEW YORK, N. Y.

## IMPROVEMENT IN EVAPORATORS FOR SIRUPS AND OTHER LIQUIDS IN VACUO.

Specification forming part of Letters Patent No. **147,149**, dated February 3, 1874; application filed August 21, 1873.

*To all whom it may concern:*

Be it known that I, FRANZ O. MATTHIESSEN, of the city, county, and State of New York, have invented certain Improvements in Evaporating Apparatus, of which the following is a specification:

This invention, which is more particularly designed to be applied to apparatus for evaporating sugar-juices, but may also be used for the evaporation of other liquids, consists, generally, in an arrangement within a vacuum-pan of a series of evaporating-trays constructed with double bottoms and set to incline consecutively in reverse directions, one below the other, steam or hot water being made to circulate through the double or hollow bottoms of the trays, whereby a very perfect and economical evaporating action at either high or low temperatures is obtained. The invention also comprises, in a series of evaporating-trays arranged as described, a certain construction of trays with hinged or adjustable ends, whereby the depth of the liquid exposed to evaporation in the trays and exposure of said liquid as it flows over the trays may be regulated as required.

Figure 1 represents a vertical longitudinal section of my improved evaporating apparatus under one form of its construction, and Fig. 2 an end view of the same.

Similar letters of reference indicate corresponding parts.

A is a vacuum pan or chamber, which may be connected with its exhaustor at *b*. B B are trays, of which there may be any desired number, arranged one below the other, within the pan A, and set inclining, consecutively, in reverse directions, to establish a flow of the juice alternately to the right and left of the pan as it passes from the lower end of each tray in succession to the upper end of the tray immediately below it, the lower end of each tray being suitably fore-shortened relatively to the upper end of the next tray below it to pass the juice from tray to tray, as described. These trays B are made with double or hollow bottoms *c*, through which steam or hot water is caused to circulate by means of branches *d* arranged to connect either directly or indi-

rectly, by bent cross-pipes *e*, with or near the opposite ends of each hollow bottom *c*, and attached to upright steam or hot-water supply-pipes C and discharge-pipes D, which are disposed in pairs outside of either end of the pan, and are provided with safety-valves and steam-gages. The lower or overflow ends *g* of the trays are hinged below at *s* in a close manner, to constitute gates for the purpose of varying the heights of the upper edges of said ends *g*, to regulate the depth of juice under exposure in the trays according to the evaporation taking place, or as other circumstances may direct. These adjustable overflow ends, or gates *g* may be operated either singly or collectively by means of levers *h* on the outside of the pan. E is the pipe by which the juice is supplied to the top tray for circulation over the several trays in succession, till finally, or after the necessary evaporation has been effected, it is delivered in the bottom of the pan A, from whence it is discharged into one or other, alternately, of two receivers, G G, provided with valves *i* to exclude air from the pan and prevent the impairing of the vacuum therein.

The hollow-bottomed trays, arranged as described, not only provide for the exposure of the juice in a thin layer or spread form, but require very little steam or hot water to heat them, and of a low temperature as compared with other evaporating devices.

What is here claimed, and desired to be secured by Letters Patent, is—

1. The combination of a series of evaporating-trays, B, having double or hollow bottoms *c* for the circulation of steam or hot water, and set to incline consecutively in reverse directions, one below the other, substantially as and for the purposes herein set forth.

2. The trays B, constructed with hinged or adjustable ends, and arranged in relation with each other essentially as described.

F. O. MATTHIESSEN.

Witnesses:

HENRY T. BROWN,  
MICHAEL RYAN.