

No. 749,552.

PATENTED JAN. 12, 1904.

W. GREINER.
EVAPORATING APPARATUS.
APPLICATION FILED JAN. 19, 1903.

NO MODEL.

Fig. 2.

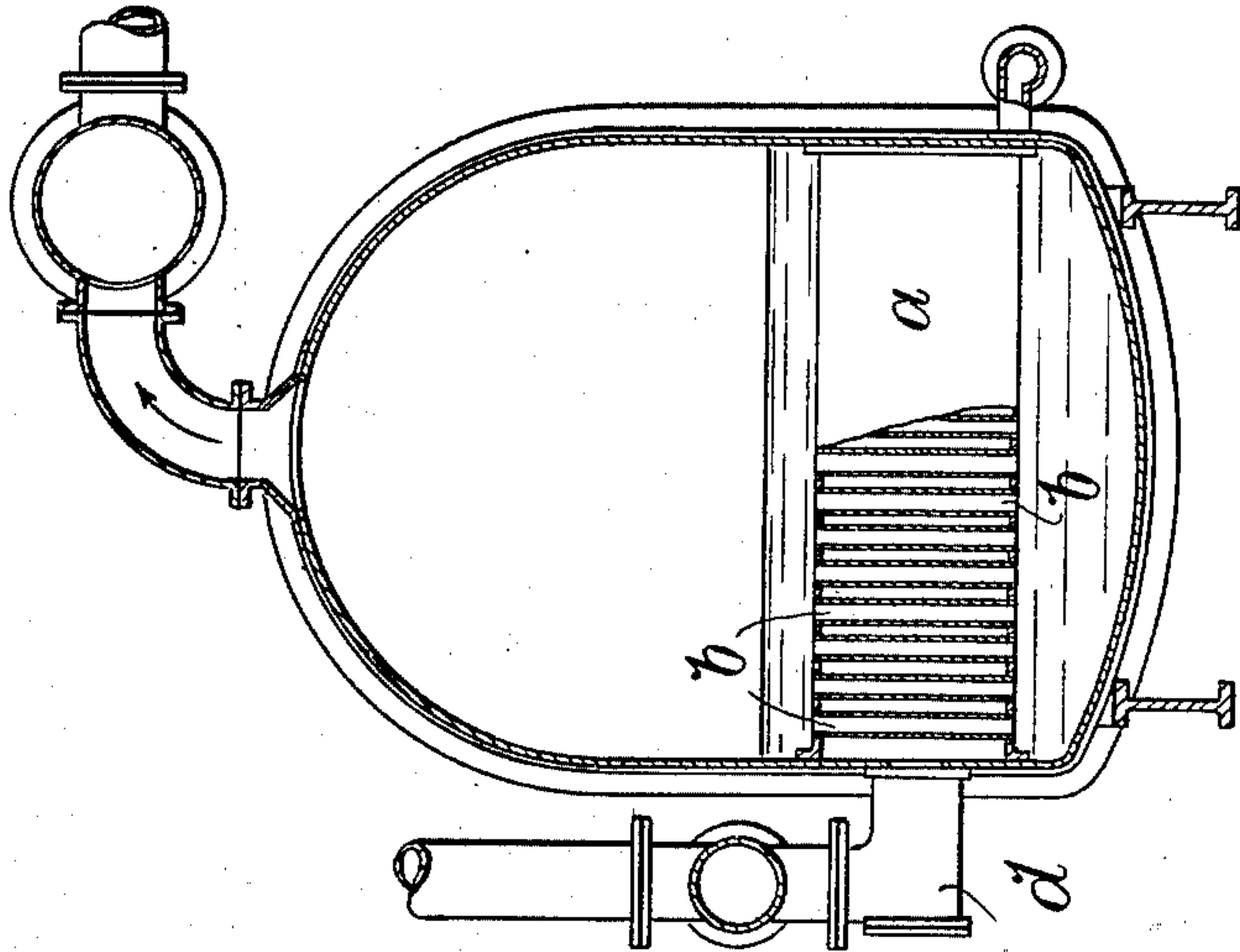


Fig. 1.

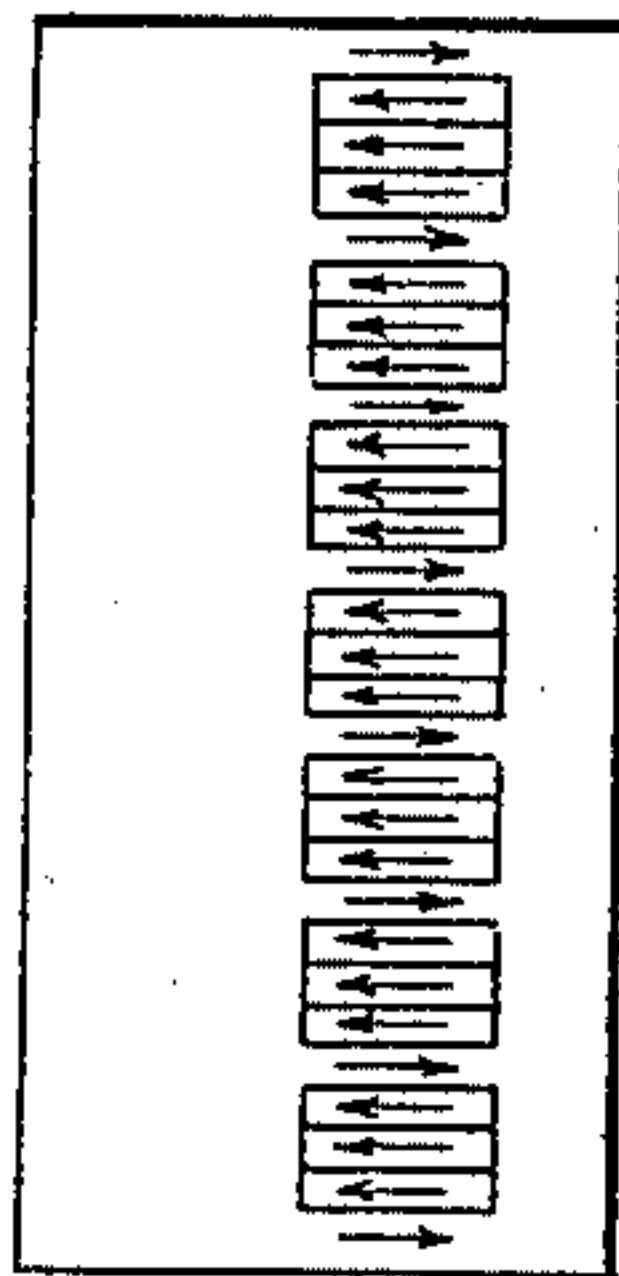
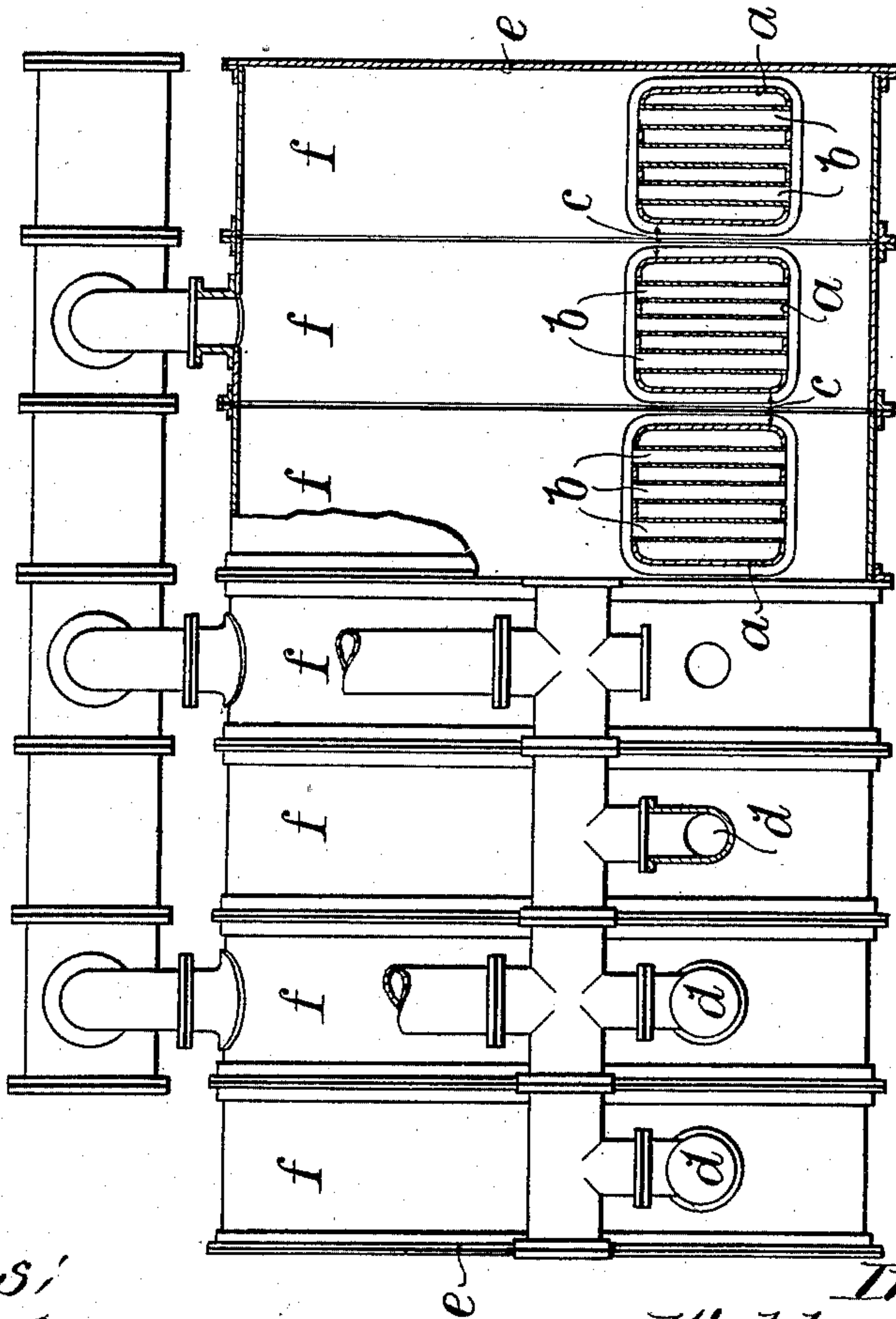


Fig. 3.

Witnesses:
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UNITED STATES PATENT OFFICE.

WOLDEMAR GREINER, OF BRUNSWICK, GERMANY.

EVAPORATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 749,552, dated January 12, 1904.

Application filed January 19, 1903. Serial No. 139,660. (No model.)

To all whom it may concern:

Be it known that I, WOLDEMAR GREINER, engineer, a subject of the Emperor of Germany, residing at Brunswick, Duchy of Brunswick, Empire of Germany, have invented certain new and useful Improvements in Evaporating Apparatus, of which the following is a specification.

This invention relates to steam-heated evaporating apparatus of a type well known in sugar-works and other industries, and more particularly relates to apparatus having a box or inclosed form, such as is shown in the drawings.

Figure 1 is a side view, partly in elevation and partly in section, of an apparatus constructed according to my invention. Fig. 2 is a cross-sectional view of the same. Fig. 3 is a diagrammatic view illustrating the circulation of the fluid through the tubes of the heating-chambers and between the heating-chambers.

Instead of a heating-chamber or group of pipes a number of small separate chambers a are provided in the hollow space of the casing and are traversed by heating-pipes b in the usual manner. These chambers extend in the form of a bridge across the casing from one side to the other and are so arranged as to leave an interstice c between them through which the fluid, which is charged with steam in the pipes b , is forced upward and descends freed from steam in order to again commence the operation—that is to say, the chamber a is supplied with steam from the pipe d , while the small tubes b , which are open at each end, pierce the top and bottom walls of the chambers, so that the fluid which extends above and below the chambers a may flow through the tubes. When the chamber is heated by steam, the fluid which is already in the tubes becomes heated and rises, while from below fresh fluid is drawn into the tubes. Between each two chambers a a space c is provided through which the fluid above the chambers a may flow to the space beneath the chambers a to be again drawn up through the tubes b , said fluid of course being heavier than the fluid in the pipes b by reason of the fact that the

steam has been allowed to escape therefrom. A circulation of the fluid to be vaporized is thus produced, which greatly assists the interchange of the particles of the fluid on the heating-surfaces, and thus very considerably increases the absorption of heat in the fluid. Fig. 3 is a diagram of this circulation. This kind of heating-chamber also admits of the casing being divided in such manner that each part forms a separate portion of the heating-chamber. By this means constructive parts or elements f for evaporating apparatus are formed, each of which consists of a part of the casing and a heating-chamber a , and when several of them are put together and provided with cable-plates e they form a complete apparatus. This division of the whole, or, vice versa, the formation of an apparatus of such parts, has the following advantages: The number of the parts, and consequently the efficiency of the apparatus, may be increased or diminished without any appreciable difficulty, and it is possible at any time to suit the apparatus to increased or altered requirements, which is of great value in the construction of separate bodies in multiple apparatus. The separate parts or elements may also be transposed, and by increasing them at one place or diminishing them at another the bodies themselves may be balanced one against the other, subsequently correctly as experience may dictate. This is essential, because in the difficulty of working the requirements can hardly ever be correctly calculated in advance. All the appliances are also made of uniform parts, which greatly facilitates as regards labor and material their manufacture on a commercial scale. Their carriage is also facilitated, as even the largest bodies may be divided into a very large number of parts. This is of great value, more particularly for transportation by sea or over mountains and often for ordinary railway carriage.

I declare that what I claim is—

In an evaporating apparatus, a chamber formed of a series of uniform removable sections, a series of independent heating-chambers located in said chamber and extending transversely and from side to side thereof,

each of said heating-chambers being carried
by one of said sections and having a series of
separated upright open-ended tubes piercing
its top and bottom, said chambers being sepa-
5 rated and arranged in parallel relation to each
other, substantially as described and for the
purpose set forth.

In testimony whereof I have hereunto set
my hand in presence of two subscribing wit-
nesses.

WOLDEMAR GREINER.

Witnesses:

WILHELM LEHRKE,
JULIUS SECKEL.