

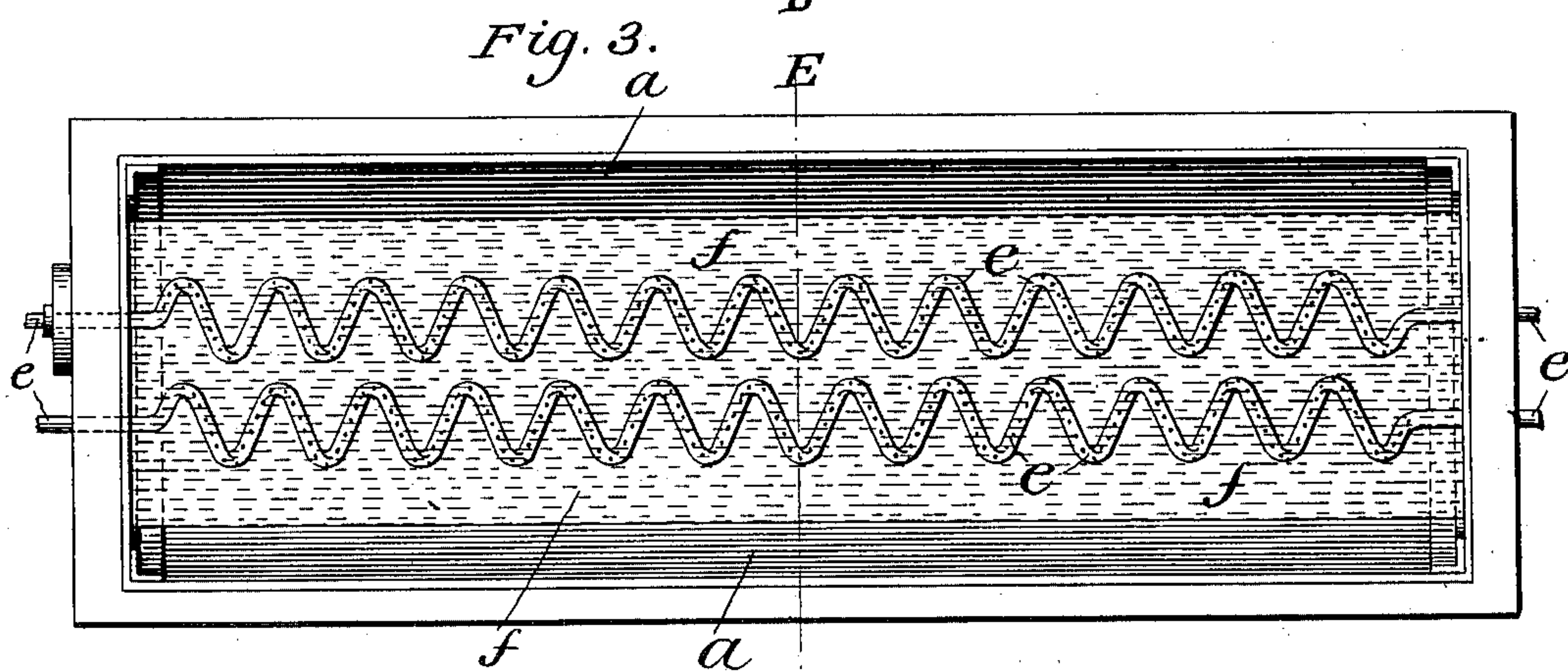
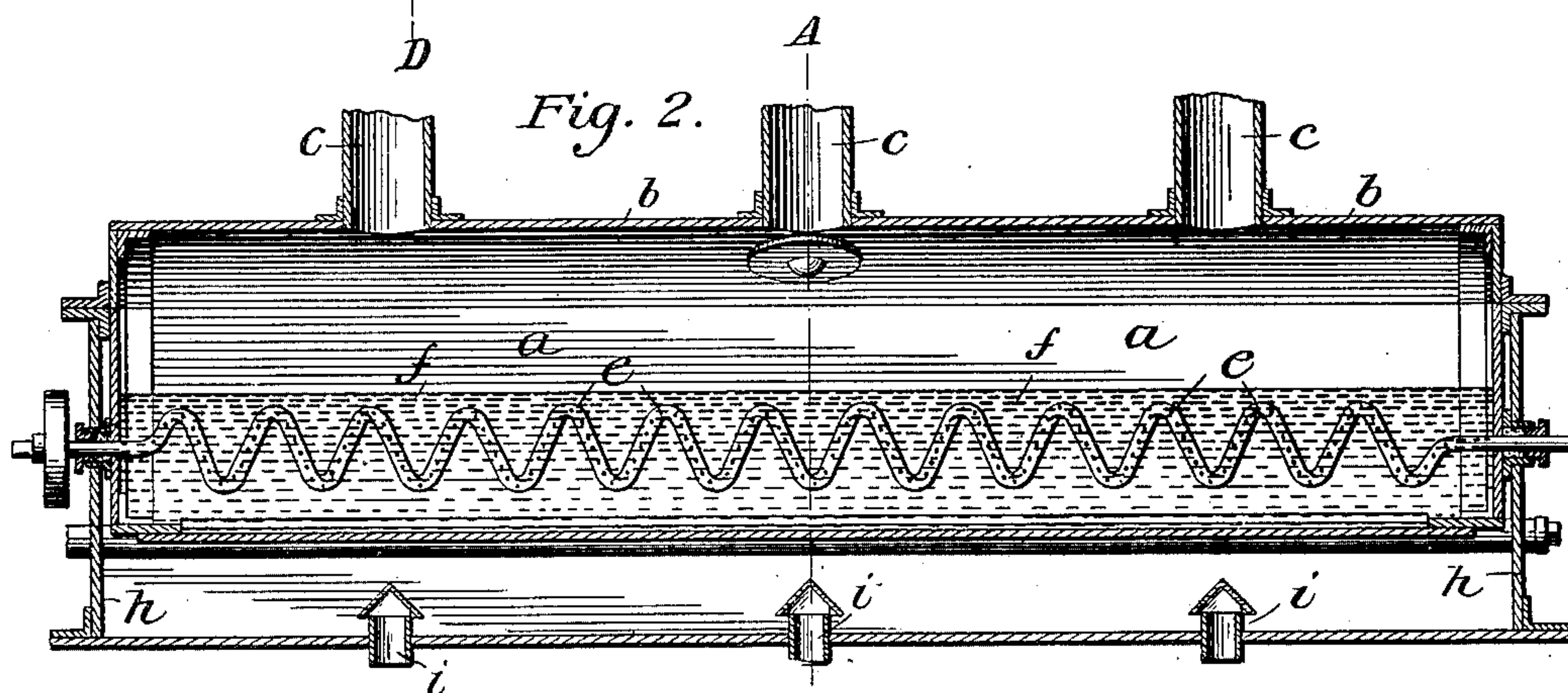
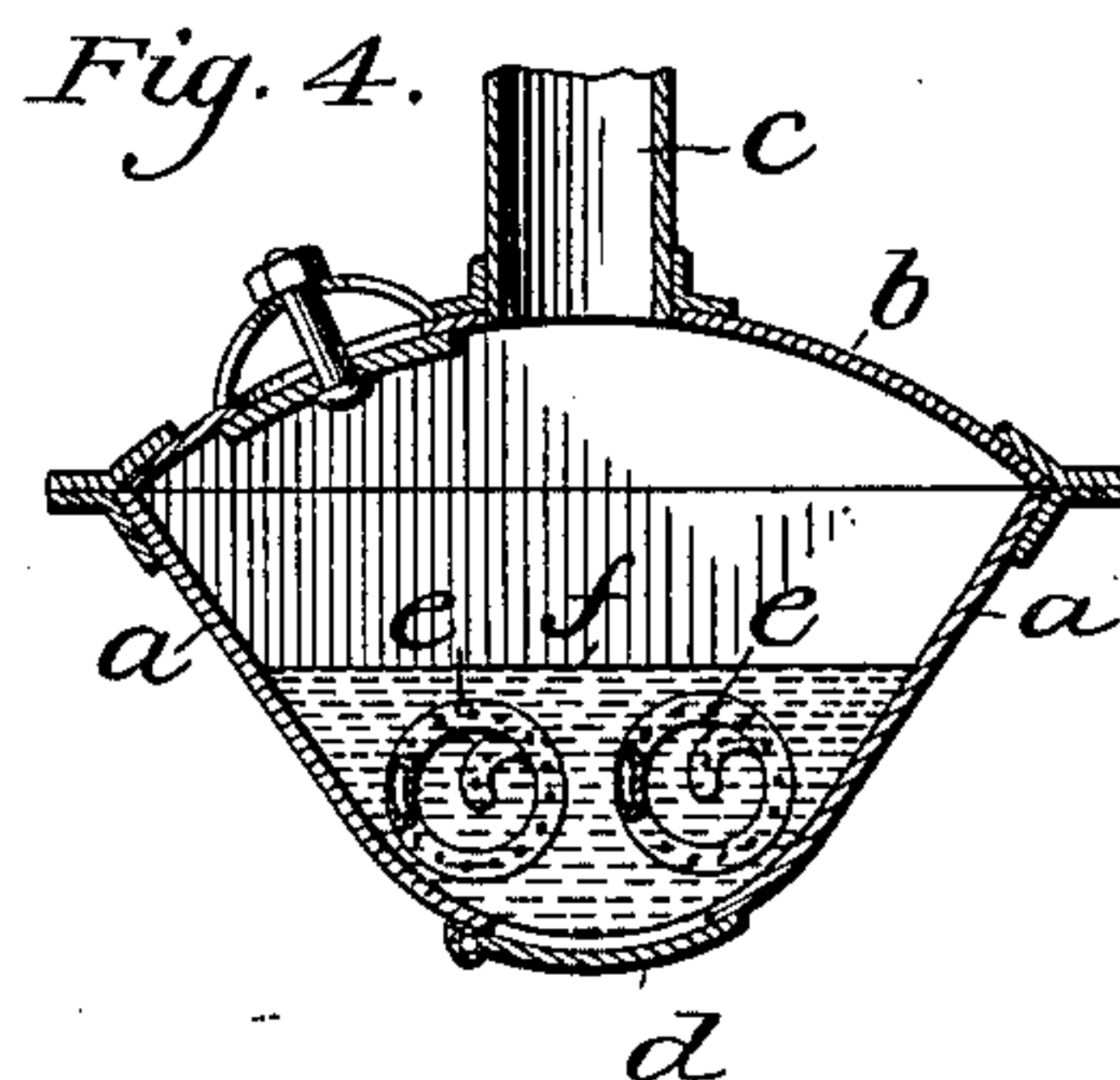
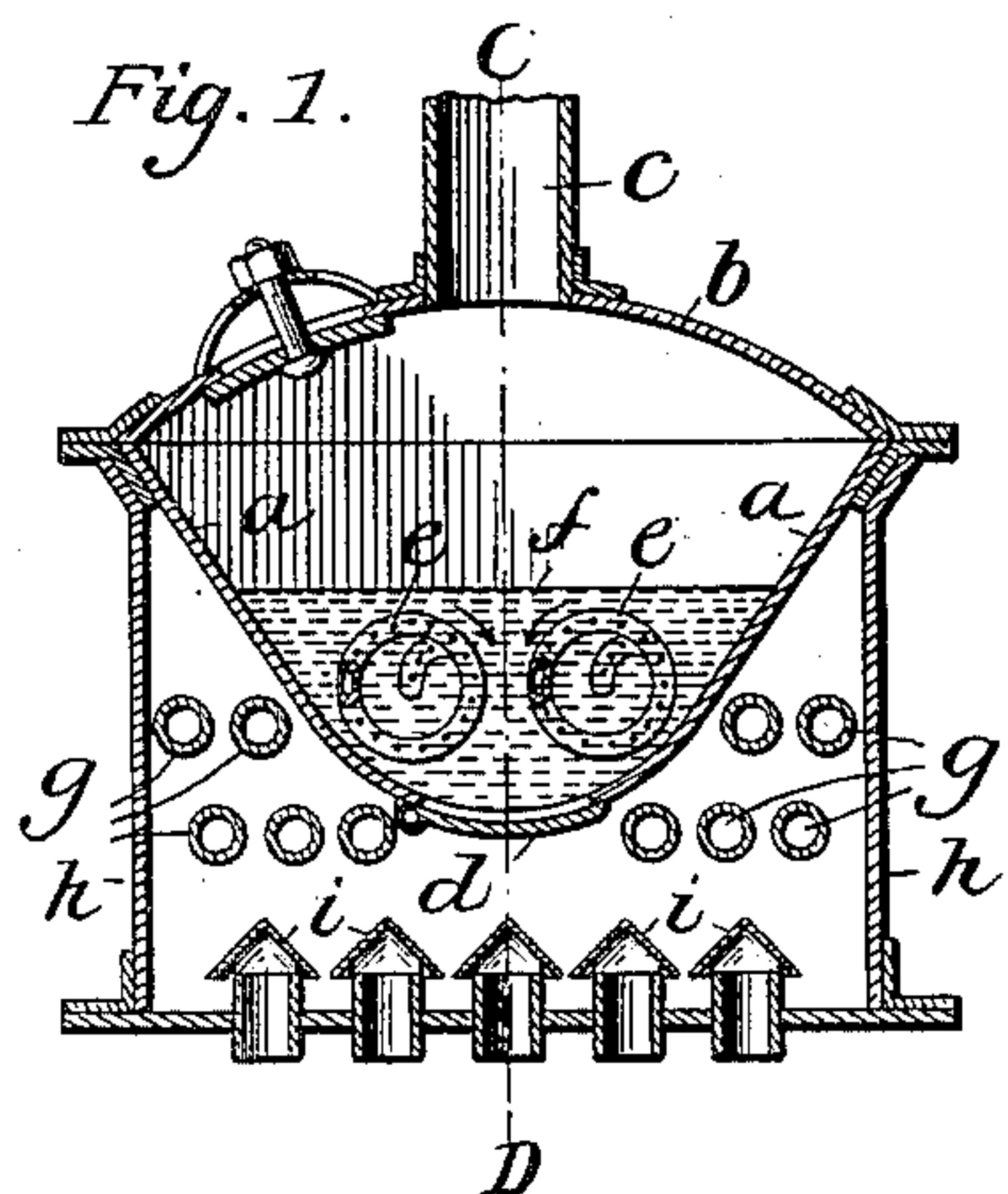
No. 657,764.

Patented Sept. 11, 1900.

B. FISCHER.  
MALT DRYING APPARATUS.

(Application filed May 10, 1899.)

(No Model.)



Witnesses

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E

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# UNITED STATES PATENT OFFICE.

BERNHARD FISCHER, OF MANNHEIM, GERMANY.

## MALT-DRYING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 657,764, dated September 11, 1900.

Application filed May 10, 1899. Serial No. 716,296. (No model.)

*To all whom it may concern:*

Be it known that I, BERNHARD FISCHER, a subject of the Grand Duke of Baden, residing at Mannheim, in the Grand Duchy of Baden, Germany, have invented certain new and useful Improvements in Apparatus for Floor and Kiln Drying Malt-Houses, of which the following is a specification.

The subject-matter of the present invention is an apparatus which with slight modification can be used as well for floor as for kiln drying malting-houses. It enables the malting to be effected in a more perfect manner than hitherto and effects a great economy of space, power, and heating materials. This end is obtained by constructing the organ which effects the mechanical mixing, and, indeed, treats the whole quantity at the same time, of a form and giving to it such a motion as is required for the protection of the germ in the floor malting-house, and also hollow, so that the necessary moistening or heating agent may be introduced.

In the accompanying drawings, representing this invention, Figure 1 is a vertical section on the line A B of Fig. 2 of the apparatus for a kiln-drying malting-house. Fig. 2 is a longitudinal section on the line C D of Fig. 1. Fig. 3 is a plan of the apparatus for cellar malting-houses after the removal of the cover. Fig. 4 is a section on line E F of Fig. 3.

In a trough *a*, which is closed by a cover *b*, carrying the exit-pipes *c* and provided with a door *d* at the bottom or one of the ends for the purpose of emptying the trough, spiral tubes *e* are arranged in a known manner with stuffing-boxes, so that they can rotate. The troughs *a* are supported in the casings *h*, through which the heating-tubes *g* pass and in which a sufficient circulation of the air is rendered possible by the capped inlet-tubes arranged at the bottom. The tubes *e* rotate in opposite directions, as shown by the arrows in Fig. 1, and thus cause the malt *f* to circulate in waves, for, because the spiral tubes are made with winding in the same direction, but rotate in opposite directions, one of the tubes *e* pushes the surrounding malt toward the left end of the trough, whereas the other tube *e* drives the malt toward the right end of the trough, and because the malt stands about fifteen centimeters above the spiral

tubes *e* a light continuous wave-like circulation is obtained, which mixes the malt in a much more perfect manner than was possible with the best malt-mixers hitherto used.

The manner of using the apparatus is as follows: The door in the cover *b* is opened and a sufficient quantity of malt is put into the trough *a*, after which the door in the cover is closed and the heating agent is allowed to pass through the tubes *e*, which are at the same time caused to rotate. When the process has been continued until the desired effect has been obtained, the door *d* in the bottom or at one of the ends or at the side is opened and the trough is emptied. The desired end can either be that of floor malting-houses or of kiln-drying malting-houses, so that two different modifications of the spiral tubes *e* can be used. For example, for floor malting-houses perforated spiral tubes *e* are used, through which moist air of about 14° Réaumur is allowed to pass from both sides during the rotation, which passes through the perforation in the sides of the tubes *e*, through the malt, and escapes through the outlet-pipes *c*. By this means the effect desired in floor malting-houses—that is, the prevention of the malt from becoming moldy—is obtained without the germ of the malt being injured. The heating-tubes *e* are not made use of in this case. For kiln-drying malt-houses non-perforated spiral tubes *e* are used in the trough *a*, through which steam or hot vapor is allowed to pass. The spiral tubes *e* upon rotating act perfectly for the purpose of mixing, inasmuch as they treat the entire contents of the trough at the same time. The trough is heated in this case from below by the heating-tubes *g*, whereby a considerable economy is obtained as compared with the systems in which the entire drying-rooms are heated. Moreover, the drying is accelerated by the heated spiral tubes *e*, and, finally, in the last stages of the drying steam under a higher pressure can be allowed to pass through the spiral tubes *e* and the malt thus be given the desired brown crust by reason of which it receives the good taste. In this case instead of the door *d* in the bottom a door must be arranged at one of the ends. For the purpose of emptying the trough it is only necessary to open the door and to cause both tubes

to rotate in the same direction. They then act as transport-spirals and drive the malt in the same direction through the open door.

I am aware that the use of revolving spirally-coiled pipes in drying apparatus is not broadly new and also that it is common to use in drying apparatus paired revolving shafts geared together and armed with radial beaters.

to What I claim, and desire to secure by Letters Patent of the United States, is—

In an apparatus for floor and kiln drying malting-houses, the combination of the trough

*a*, and the pair of correspondingly-coiled spiral heating-pipes *e, e*, mounted therein in parallel position and in close proximity and rotated in opposite directions so as to effect a continuous circulation of the material from end to end of the trough while drying the same as explained. 15

In testimony whereof I have hereunto set my hand in the presence of two witnesses. 20

BERNHARD FISCHER.

Witnesses:

JACOB ADRIAN,

THEODOR EHRHARD.