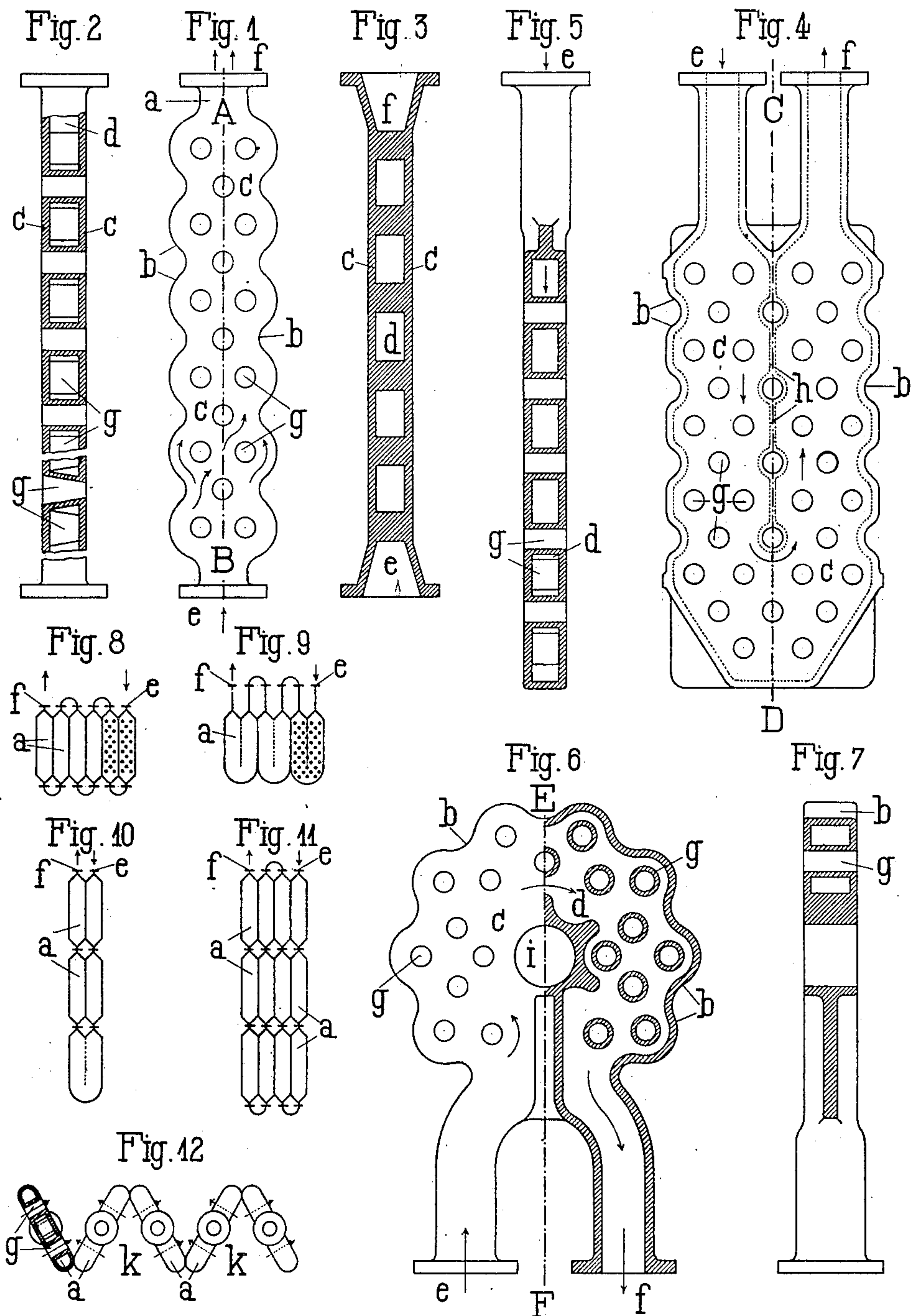


No. 888,169.

PATENTED MAY 19, 1908.

J. HEIZMANN.  
HEATING OR COOLING APPARATUS.

APPLICATION FILED JULY 1, 1907.



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# UNITED STATES PATENT OFFICE.

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## HEATING OR COOLING APPARATUS

No. 888,169.

Specification of Letters Patent.

Patented May 19, 1908.

Application filed July 1, 1907. Serial No. 381,754.

*To all whom it may concern:*

Be it known that I, JULES HEIZMANN, a subject of the German Emperor, and residing at Strassburg, Alsace, German Empire, have invented certain new and useful Improvements in Heating or Cooling Apparatus, of which the following is a specification.

My invention relates to improvements in devices for heating, drying, superheating, condensing, cooling or the like.

The object of the invention is to provide a construction in which, for minimum bulk, there is a maximum effective heating or cooling surface presented, this object being secured by providing specially formed chambers for the passage of the fluid to be heated or cooled. Each apparatus may be used as a separate device, or in an assemblage, as in superheaters, coolers, or the like.

My invention is illustrated in the accompanying drawing, in which—

Figure 1 is an elevation of one form of the apparatus. Fig. 2 is a sectional view, the upper part being a section on the line A—B of Fig. 1, while the lower part shows a modification. Fig. 3 is a vertical section through a second modification. Fig. 4 is an elevation of an apparatus having a double body. Fig. 5 is a section on the line C—D of Fig. 4. Fig. 6 is an elevation and part section of a further modification. Fig. 7 is a section on the line E—F of Fig. 6. Figs. 8-12 illustrate various methods of assembling the apparatuses.

The body *a* of the apparatus may be cast, welded, or riveted. Its side walls *b* are sinuous and together with the front and back walls *c* inclose a chamber *d* having an inlet and an outlet *e, f*. The walls *c* are stayed by means of short pipes *g* or the like, cast with the body or secured in place in any suitable manner. They may, if desired, be conical (Fig. 2), and constitute passages through the body of the apparatus. These pipes *g* may be replaced by solid members, as shown in Fig. 3.

The fluid passing through the body *a* contacts with the sinuous walls *b* and also with the pipes *g*, so that it is constantly being separated into currents and thoroughly mixed. The direction of motion of the fluid may penetrate the chamber at any desired angle.

The body *a* is so set up that the heating or cooling medium surrounding it will contact

with the side walls *b* and the walls of the pipes *g*. In this manner the effective heating or cooling surface presented is relatively very large. The fluid flowing through the chamber *d* is kept in constant motion, in order that all solid portions may be contacted with as often as possible.

Such a device may be placed in any desired position and any number of such devices may be assembled in any suitable manner, whether parallel with each other or in line, as shown for instance in Figs. 8, 10 and 11. These figures are diagrammatical and show respectively in Fig. 8, a number of devices constructed as in Fig. 1, set side by side the fluid flowing alternately upward and downward through adjacent chambers until the end of the series is reached; in Fig. 10 two upper pairs of chambers constructed as in Fig. 1 and a lower chamber constructed as in Fig. 4, the fluid passing down through the right hand chambers of the two pairs, then down and up through the lower chamber, and finally up through the left hand chambers of the two pairs and out; and in Fig. 11 three series of chambers as in Fig. 1, each series comprising four chambers, and the three series being arranged one series above the other, the fluid passing down through the right hand chambers of all the series, then up through the adjacent chambers of all the series, then down again through the next line of chambers, and finally up through the left hand line of chambers of the three series, and out.

The device may have a double body *a*, such, for instance as shown in Fig. 4. The central partition *h* compels the fluid to flow through the entire apparatus. Fig. 9 illustrates an assemblage of such double devices, in which the fluid passes alternately up and down through the successive series.

Figs. 6 and 7 show another modification of the invention. If placed in vertical position and assembled in a row, the connected inlets and outlets *e, f*, would constitute feet. The heat radiating or absorbing fluid medium would contact with the outer walls *b* and pass through the passages *g* and central eye *i*.

The devices might be inclined to one another, such for instance as shown in Fig. 12. The medium would here flow through the angularly arranged spaces *k* and pass through the passages *g*, as indicated by the arrows.

In Figs. 8 to 12 of the drawing, which, as



hereinbefore stated, are diagrammatical, and which, as will be readily observed, are drawn to a very small scale, no attempt has been made to show the specific construction of each apparatus comprised in the several arrangements, such figures being intended solely to illustrate the manner in which series of the devices may be arranged to cooperate with each other, and to show how the fluid passing through one body may be caused to pass through others arranged adjacent thereto.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. A heating and cooling device comprising two parallel flat plates, stays connecting them and maintaining them apart forming a space between them, edge plates of corrugated form secured between the parallel plates and forming boundaries for the inclosed space, and an inlet and outlet for said inclosed space, said stays being arranged in parallelism with the corrugated edge plates and in such relation therewith and with each other as to cause the medium passing through the inclosed space to travel in sinuous paths and to contact with said stays and corrugated edge plates, substantially as and for the purpose specified.

2. A heating and cooling device comprising two parallel flat plates, tubular stays connecting them and maintaining them apart forming a space between them, edge plates of corrugated form secured between the parallel plates and forming boundaries for the inclosed space and an inlet and outlet for said inclosed space, said tubular stays being arranged in parallelism with the corrugated

edge plates and in such relation therewith and with each other as to cause the medium passing through the inclosed space to travel in sinuous paths and to contact with said stays and corrugated edge plates, substantially as and for the purpose specified.

3. A heating and cooling device comprising two parallel plates, stays connecting them and maintaining them apart forming a space between them, edge plates of corrugated form secured between the plates and forming boundaries for the inclosed space, inlet and outlet pipes side by side communicating with the inclosed space, and a partition between the inlet and outlet pipes secured between the parallel plates and projecting into the inclosed space, substantially as and for the purposes specified.

4. A heating and cooling device comprising two parallel plates substantially circular in form, tubular stays connecting them and maintaining them apart forming a space between them, corrugated plates secured between the peripheral edges of the parallel plates forming boundaries for the inclosed space, a radial partition extending into the inclosed space and terminating in the center of the inclosed space, and two substantially parallel passages on opposite sides of the radial partition forming inlet and outlet to the inclosed space, substantially as and for the purposes specified.

In testimony whereof I affix my signature, in presence of two subscribing witnesses.

JULES HEIZMANN.

Witnesses:

JOSEPH ROHMER,  
R. W. FISHER.