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1,453,220

E. WITZENMANN

DOUBLE WALLED TUBE FOR HEATING AND COOLING PURPOSES

Filed March 4, 1918

Fig. 1.

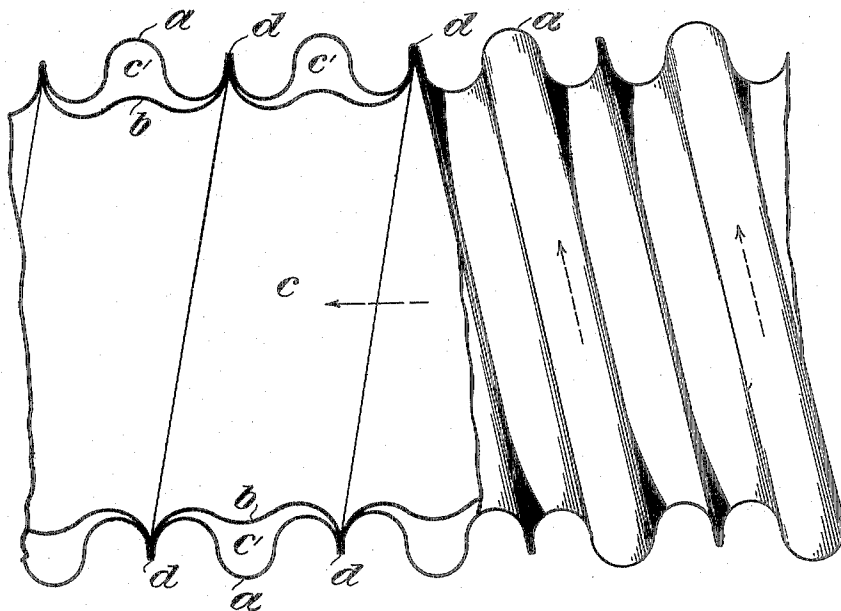


Fig. 2.

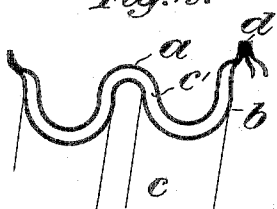


Fig. 3.

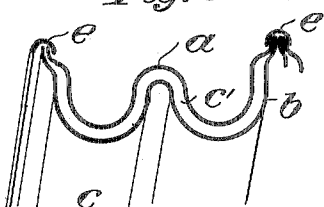


Fig. 4.

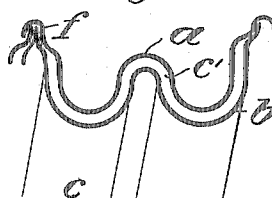


Fig. 5.

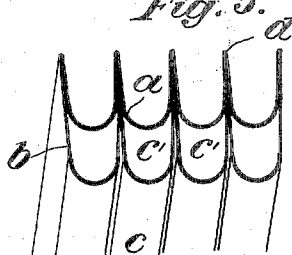
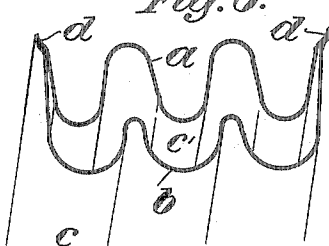


Fig. 6.



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UNITED STATES PATENT OFFICE.

EMIL WITZENMANN, OF PFORZHEIM, GERMANY.

DOUBLE-WALLED TUBE FOR HEATING AND COOLING PURPOSES.

Application filed March 4, 1918. Serial No. 220,384.

(GRANTED UNDER THE PROVISIONS OF THE ACT OF MARCH 3, 1921, 41 STAT. L., 1313.)

To all whom it may concern:

Be it known that I, EMIL WITZENMANN, a citizen of the German Republic, and resident of Pforzheim, in the German Republic, have invented a new and Improved Double-Walled Tube for Heating and Cooling Purposes (for which I have filed application in Germany, April 13, 1917), of which the following is a specification.

This invention relates to a double-walled tube which is intended for heating and cooling purposes and is provided with undulated walls, the undulations running spirally around the tube like the threads of a screw and forming a spirally-shaped channel encompassing the inner space of the tube and serving to receive the heating or cooling medium, such as a liquid, a gas, air, or the like.

Owing to this configuration of the heating or cooling tube, the exchange of the heat is very efficacious and the tube is rendered yieldable and pliable so that no special means for compensation and elongation is required.

In order to make my invention more clear, I refer to the accompanying drawings, in which:

Figure 1 shows a piece of a heating or cooling tube constructed according to my invention, the piece of tube being represented partly in side-view and partly in longitudinal section;

Figures 2, 3, 4, 5 and 6 show portions of similarly shaped tube walls in section, the differences being explained in the detailed part of this specification.

Referring to Figure 1, the double tube consists of two tubes of approximately screw-thread-like appearance, one of the tubes enclosing the other, both having undulations forming continuous convolutions of the metal bands *a* *b*, and the undulations or convolutions of the two tubes being differently shaped in section so as to form between themselves a spirally-shaped channel *c'* through which the heating or cooling medium, i. e., an appropriate liquid, gas, air, or the like, is led. *c* is the space within the tube *b*, through which the medium to be

heated is conducted. The neighbouring rims or edges *d* of the metal bands *a* and *b* are tightly connected or united with each other by soldering, welding, folding, or the like.

In the form of construction shown in Figure 2, the sectional shapes of the undulated metal bands are not different, but practically one like the other, each band forming two groove-like depressions and between these latter a ledge-like elevation. The rims *d* may be connected either by soldering or by electric or autogenous welding.

The form of execution shown in Figure 3 resembles that just described, there being solely the difference that the rims of the metal bands are covered by an appropriately profiled band *e*. Instead of employing a special band, such as *e*, one of the rims of the outer tube band may be adequately bent round so as to form a fold for connecting the two tube bands with each other as in Figure 4.

The section of the metal bands *a* *b* may be also that of a U, as shown in Figure 5, the legs of the U's having different length so as thereby to form the channel *c'*. The edges of the legs are again connected with each other by soldering, welding, folding, or in any other manner. Two or more of such or similar U-shaped grooves or depressions, in connection with an elevation or with elevations between them, may be provided in one metal band of appropriate breadth as shown in Figure 6.

Having now described my invention, what I claim as new and desire to secure by a patent of the United States is:

1. A double-walled tube comprising an inner wall consisting of one continuous spirally shaped strip, an outer wall consisting of one continuous spirally shaped strip having its convolutions extending in the same direction to that of the strip of the inner wall, the opposite edges of said strips being bent outwardly and the outwardly bent edges of said strips being connected together.

2. A tube of the character described comprising an inner and outer wall, said walls each consisting of a corrugated strip of

metal and the opposite edges of said corrugated strips being connected together.

3. A tube of the character described comprising an inner and outer wall, each of said
5 walls consisting of a corrugated spiral strip of metal, the corrugations of each strip extending parallel with the edges thereof and means for connecting the adjacent edges of

the strips together whereby a spiral channel will be formed.

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

EMIL WITZENMANN.

Witnesses:

MASO ALT,
FRANZ BINNINGER.