Apr. 24, 1923. 1,453,250

R. SCHNOECKEL

HEAT EXCHANGING APPARATUS

Filed Aug. 26, 1922

Fig. 1.

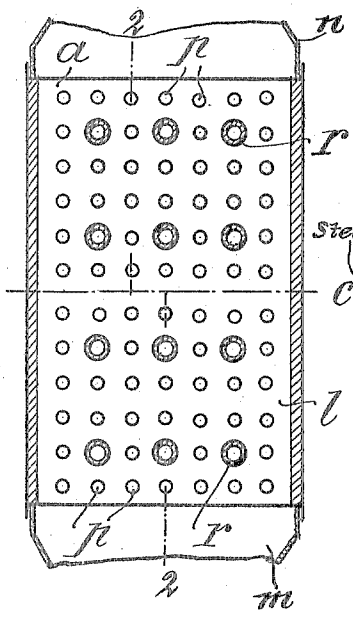


Fig. 2.

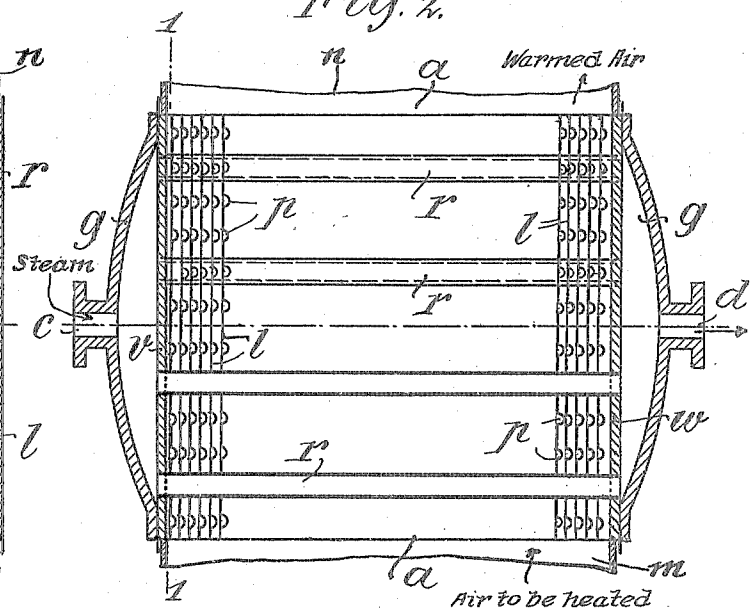
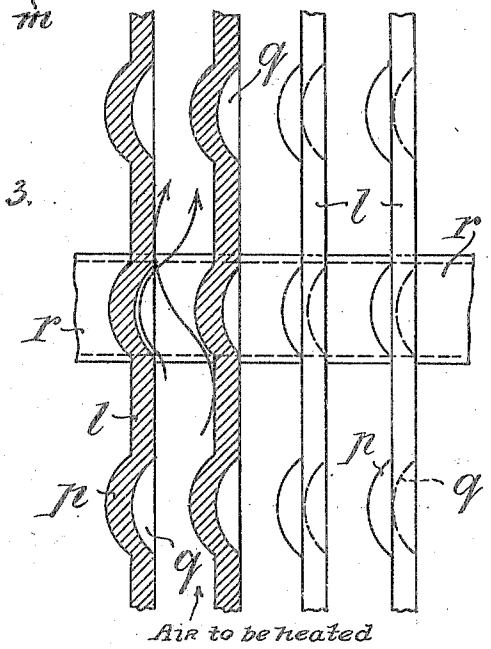


Fig. 3.



Witnesses:
Emil Kayser
Arthur Scholz.

Inventor:
Richard Schnoeckel.
By:
Attorney.

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UNITED STATES PATENT OFFICE.

RICHARD SCHNOECKEL, OF AUERBACH, GERMANY, ASSIGNOR TO C. G. HAUBOLD AKTIEN-GESELLSCHAFT, OF CHEMNITZ, GERMANY, A JOINT-STOCK COMPANY OF GERMANY.

HEAT-EXCHANGING APPARATUS.

Application filed August 26, 1922. Serial No. 584,593.

To all whom it may concern:

Be it known that I, RICHARD SCHNOECKEL, manufacturer, a citizen of the German Republic, residing at Auerbach, Vogtland, Herrenwiese 8, Germany, have invented certain new and useful Improvements in Heat-Exchanging Apparatus, of which the following is a specification.

My invention relates to improvements in heat exchanging apparatus, and more particularly in apparatus of the type in which the fluid to be heated or cooled is made to flow in contact with and between plates or lamellæ placed one beside the other and held at the desired temperature by suitable means. Apparatus of this type is used for example in cases in which the velocity of the fluid flowing between the lamellæ or plates is high, and they are used for example in connection with frames for drying textile fabrics and drying machines, in which case the apparatus is used for heating air. The object of the invention is to provide a heat exchanging apparatus of the class referred to in which the fluid is brought to uniform temperature. With this object in view my invention consists in providing the plates or lamellæ with protuberances in the form of knobs adapted to deflect the fluid in different directions so as to produce whirls and to intermingle the particles of the fluid.

I am aware that heretofore the lamellæ of heat exchanging apparatus have been bent in zigzag form in order to increase the heat exchanging surface. However, I have found that the fluid moves between such lamellæ in uniform and undisturbed flow, so that the inner particles of the fluid are in a less degree affected by the temperature of the lamellæ than the outer parts.

In order that my invention may be more clearly understood an example embodying the same has been shown in the accompanying drawing, in which the same reference characters have been used in all the views to indicate corresponding parts. In said drawing,—

Fig. 1, is a cross-section of the apparatus taken on the line 1—1 of Fig. 2,

Fig. 2, is a longitudinal section taken on the line 2—2 of Fig. 1, and

Fig. 3, is a detail view partly in section and showing a part of adjacent lamellæ.

In describing the invention reference will be made to an apparatus for heating air.

In the example shown in the drawing my improved heating apparatus comprises a frame or casing *a* having at opposite ends an inlet *c* and an outlet *d* for the heating medium, a pair of partitions *v* and *w* forming with the heads *g* of the casing, chambers for the heating medium, these chambers being connected by pipes *r*, and plates or lamellæ *l* secured to the pipes *r*. The lamellæ are formed with protuberances *p* in the form of knobs and preferably on the opposite side of each plate with depressions *q* corresponding to the protuberances. As shown the protuberances are spherical in shape. In the manufacture of the lamellæ I prefer to punch the holes required for the passage of the pipes *r* and to press the protuberances in a single operation. In assembling the parts care is taken that the protuberances of one lamella are in position corresponding to the depressions of the adjacent lamella. Therefore the cross-sectional area of the passage between the lamellæ is uniform.

The arrows shown in Fig. 3 illustrate the formation of the whirls. The particles of the fluid meeting a protuberance are deflected towards the adjacent lamella so as to cross the main flow of the fluid. In a similar way the particles flowing along a depressed portion are thrown against the adjacent lamella.

If the apparatus is to be used for heating the air in a room, the top and bottom of the casing can be left open. If the apparatus is to be used for heating a current of air to be delivered to a room or to an enclosed space in which warm air is to be utilized, for example, for drying, the cold air can be supplied through a casing *m* from a suitable fan or blower, if desired, the heated air being drawn off through another casing *n*, these casings *m* and *n* being provided with suitable pipes in the well known manner.

I claim:

A heat exchange apparatus of the type having a plurality of substantially parallel plates pierced by a plurality of substantially parallel pipes at substantially right angles to said plates, the said plates being provided at regular intervals with struck-up portions

in the form of parts of spheres, the struck-up portions of all the plates being similarly arranged on said plates, and being on the same sides of said plates, whereby a given plate is everywhere at substantially the same distance from its neighbor, including the struck-up portion, the said plates being imperforate except as regards the perforations for accommodating the pipes above specified.

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

RICHARD SCHNOECKEL.

Witnesses:

CROEBES,

Dr. A. KLEVES.