G. R. MAX-KRETSCHMER.
HEATER.
APPLICATION FILED DEC. 22, 1911.

1,125,027. Patented Jan. 12, 1915.

Fig. 1

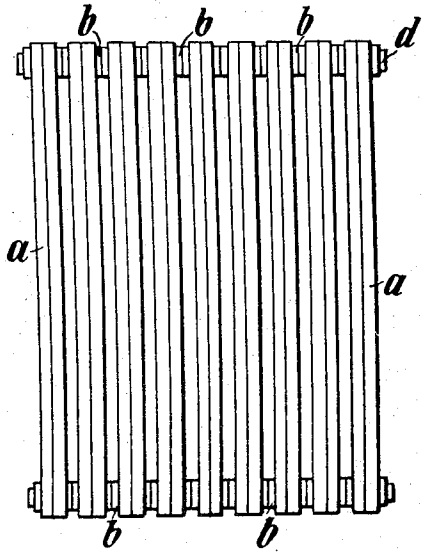


Fig. 3

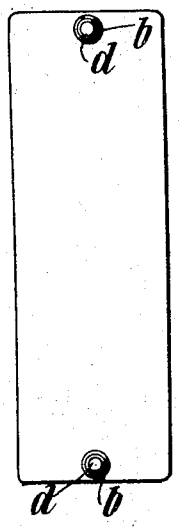


Fig. 2.

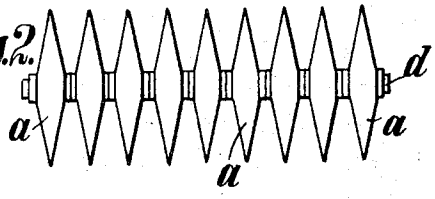
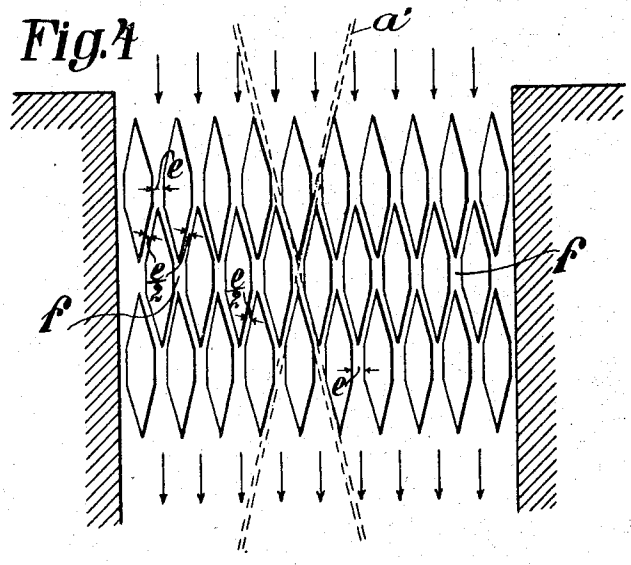


Fig. 4



WITNESSES
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GOTTFRIED RUDOLF MAX-KRETSCHMER, OF HAMBURG, GERMANY, ASSIGNOR TO THE FIRM OF RUD. OTTO MEYER, OF HAMBURG, GERMANY.

HEATER.

1,125,027. Specification of Letters Patent. **Patented Jan. 12, 1915.**

Application filed December 22, 1911. Serial No. 667,408.

To all whom it may concern:

Be it known that I, GOTTFRIED RUDOLF MAX-KRETSCHMER, a subject of the King of Prussia, residing at 23/25 Pappel-Allee, Hamburg, Germany, have invented certain new and useful Improvements in Heaters; and I do hereby declare the following to be a full, clear, and exact description of the invention.

This invention relates to heaters.

When gases, and particularly air, are heated in heating chambers it is important that the gases or air pass by the heating-surfaces at as high a velocity as possible. The coefficient of the transference of heat from the heating-surface to the air is thereby increased to a multiple of the normal, and the thermic effect of the heating-surface is also increased in the same measure.

The principal obstacle, tending to prevent the employment of high velocities is the impossibility to clean the surfaces when they are put close together. At the present time heating-surfaces of wrought iron are almost exclusively used for the warming of air, at a high velocity, such heating-surfaces have almost the form of coils or bundles of tubes traversed by steam and surrounded by air. The cast-iron heating-surfaces employed heretofore, such as radiators, ribbed tubes and the like, generally do not suffice for the purposes of heating air in heating chambers. With these heating-surfaces high velocities of the air must either be waived or the separate heating units must be placed close together to form batteries, which owing to the shape of the surfaces, it is practically impossible to clean them.

A primary object of this invention is to provide a radiator, preferably made of cast-iron, enabling a good, easy and complete cleaning of the surfaces, even when they are put close together, which is necessary if a high velocity of air is desired.

The improved radiator comprises a plurality of rows of vertical heating columns of rhomboidal shape in cross section and arranged one behind another in such manner that straight air-passages of equal cross-sectional area are formed between the columns.

One illustrative embodiment of the invention is represented by way of example in the accompanying drawing, the heating-columns being connected at top and bottom by screw-threaded nipples or some similar device.

In said drawing: Figure 1 is a front elevation showing nine heating-columns united to form one row of a radiator, Fig. 2 is a top plan view thereof, Fig. 3 an end elevation thereof, and Fig. 4 is a diagrammatic top plan view showing how three rows of heaters are inserted one behind another in an air-conduit.

Referring to the drawing, the heating columns *a* are secured together by means of nipples at the bosses *b* to form a heater, provided with plugs *d* for the pipe connections. The columns *a* which are rhomboidal in cross section are preferably formed so as to partake of the form of a rhombus or lozenge elongated along one diameter. The rows arranged parallel so that the elongated ends of the columns of one row extend between those of the adjacent rows and bear such relation thereto as to form straight passages *a'* diagonal to the general direction of the fluid current through the heater, as shown by dotted lines in Fig. 4 whereby the whole surface of any number of rows of columns can easily be cleaned. If desired the lateral edges of the columns can be flattened as shown in the drawing.

Besides being suitable for heating air by means of steam or water, the improved heating apparatus is also adapted for every other kind of transmission of heat to air, gases, water or steam, for example, for utilizing the heat of the exhaust gases of motors or boiler furnaces, and for economizers, super-heaters and the like.

According to the requirements in each instance the manner of connecting the heating-columns will be varied in suitable way, *e. g.* by the use of end boxes, or branch pipes directed upward and downward, in order to remove the connections out of reach of the hot gases, or otherwise. In contradistinction to all existing heating-apparatus serving similar purposes the described apparatus has the advantages of its being very readily cleaned, of enabling a maximum utilization of the heating-surface and of occupying a minimum amount of space.

I claim:—

A heater, comprising a plurality of rows of vertical columns connected together at their upper and lower ends, the columns of each row being rhomboidal in cross section

and spaced apart, the columns of one row extending between the columns of an adjacent row and bearing such relation thereto as to form straight passages diagonal to the general direction of the fluid current through the heater.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses.

GOTTFRIED RUDOLF MAX-KRETSCHMER.

Witnesses:
ERNEST H. L. MUMMENHOFF,
IDA CHRIST. HAFERMANN.