Sept. 16, 1924. 1,508,860

A. T. STUART

RADIATOR

Filed Aug. 22, 1921

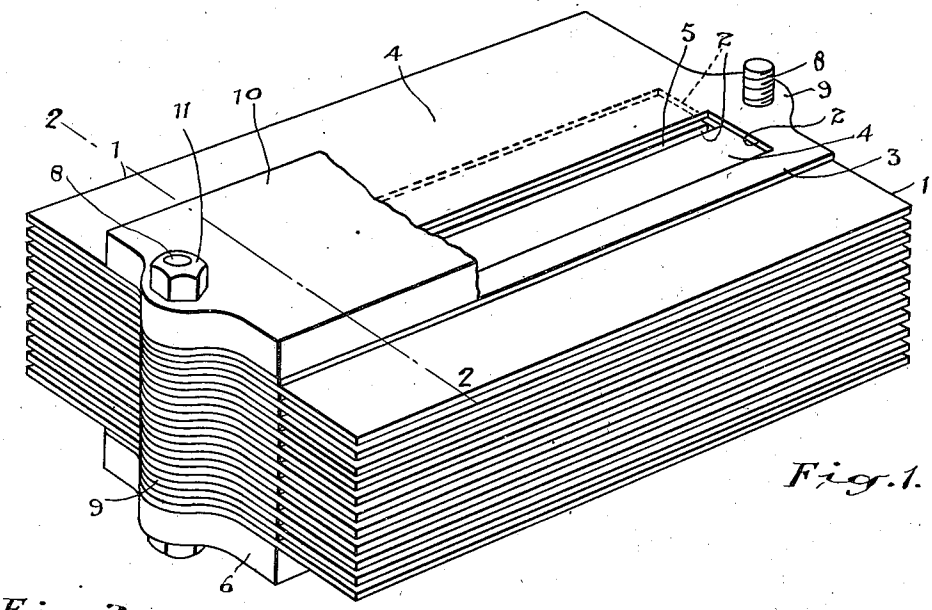


Fig. 1.

Fig. 2.

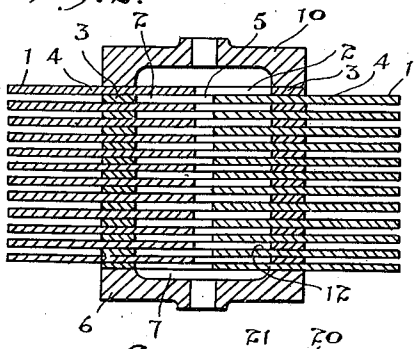


Fig. 3.

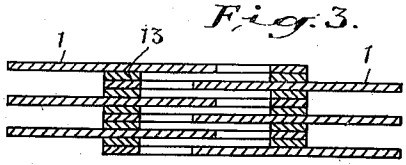


Fig. 5.

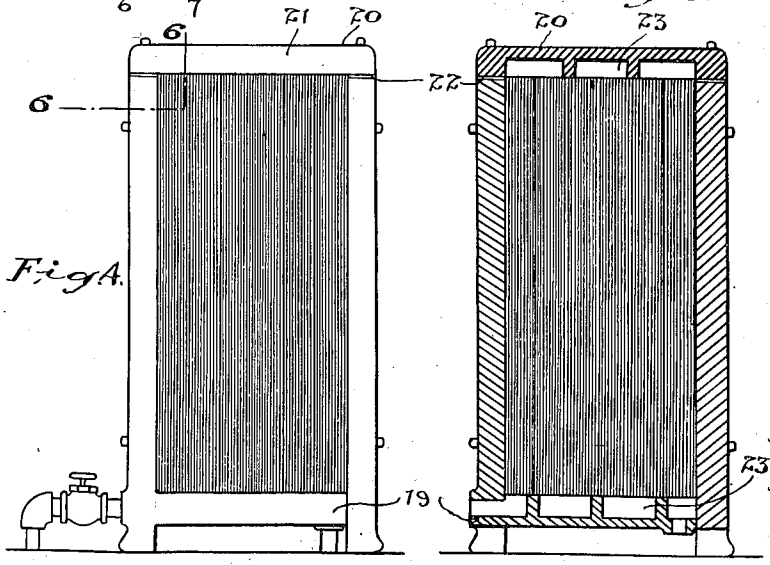


Fig. 4.

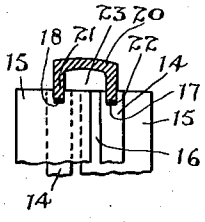


Fig. 6.

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UNITED STATES PATENT OFFICE.

ALEXANDER T. STUART, OF DETROIT, MICHIGAN.

RADIATOR.

Application filed August 22, 1921. Serial No. 494,063.

To all whom it may concern:

Be it known that I, ALEXANDER T. STUART, a subject of the King of Great Britain, and resident of the city of Detroit, State of Michigan, in the United States of America, have invented certain new and useful Improvements in Radiators, described in the following specification and illustrated in the accompanying drawings, that form part of the same.

The principal objects of this invention are to effect a material increase in the radiating efficiency of radiators, thereby greatly reducing their bulk and to effect a more thorough distribution of the generated heat.

The principal feature of the invention consists in arranging a plurality of extremely thin perforated plates face to face in such a manner that the alternate plates will project outwardly from each adjacent plate to present the maximum of radiating surface, the perforations in such plates being staggered to cause the alternate plates to project inwardly into the heated medium to absorb the heat.

In the drawings, Figure 1 is a perspective view of a radiator element constructed in accordance with this invention, a portion being broken away.

Figure 2 is a cross sectional view through Figure 1 on the line 2—2.

Figure 3 is a cross sectional view showing a modified arrangement of the elements shown in Figure 2.

Figure 4 is an elevational view of a modified form of structure.

Figure 5 is a vertical longitudinal sectional view of Figure 4.

Figure 6 is a vertical cross sectional view through the top of Figure 4 on the line 6—6.

It has been the practice in connection with heat engineering to utilize tubular structures for radiating the heat and similarly for absorbing heat such as in refrigeration. This invention contemplates the absorption and distribution of heat by means of an arrangement of a plurality of extremely thin plates of a material having very high heat conductivity.

The preferable form and arrangement of these plates is illustrated in Figures 1 and 2. The plates 1 of thin sheet metal are each formed with a longitudinal perforation 2 preferably of rectangular form and extending almost the entire length of the plate. The perforation is arranged adjacent to one of the longitudinal edges, leaving a narrow strip 3 on one side. These plates are placed together face to face and in alternating arrangement with the narrow strip of one plate resting upon the wide portion 4 of the immediately adjacent plate. The perforations 2 are by this arrangement staggered but the inward edges provide that the succeeding perforations are spaced apart, leaving a narrow free channel 5 between the rows of plates.

The plates are assembled upon a suitable form of holder illustrated in Figures 1 and 2, as a base plate 6 having a channel 7 running longitudinally thereof and communicating with the perforations in the plate.

End posts 8 are rigidly secured to the base plate and the plates 1 are formed with perforated end lugs 9 adapted to fit over the posts.

When the desired number of plates are assembled a cover plate 10 similar to the base plate 6 is placed over the posts and they are clamped securely in position, preferably by the nuts 11 threaded on the posts 8. The cover plate 10 is channeled similar to the base plate so that water, steam or other medium directed into the channel 7 in the base plate will find its way through the spaces between the various plates to the channel in the cover plate. The fluid medium passing through the closed chamber formed between the base and cover plates is baffled by the overlapping inner edges of the perforations so that the heat of said medium is brought into contact with the inward portion 12 of each of the plates 1 and as said plates are of a highly conductive material the heat is rapidly absorbed and carried outward. The air flowing around the outwardly projecting portions of the plates 1 is brought into contact with a very large radiating area with the result that the transference of the heat is extremely rapid.

It may be found advisable to space the plates 1 a farther distance apart than merely the thickness of the alternating plates and in order to accomplish this result gaskets 13 may be inserted between the faces of the plates as illustrated in Figure 3.

The introduction of the gaskets provides a larger space between the inwardly project-

ing portions of the plates and as shown in Figure 3 the edges of the perforations overlap so that the fluid is compelled to circulate in a circuitous path, creating a circulation between each adjacent pair of plates.

The portion of the several plates exposed to the fluid medium which may be either a heat carrying or a heat absorbing element is proportioned according to the average temperature required, so that the maximum efficiency in both the distribution or absorption of heat is found and the maximum of radiation effect is thus obtained.

In the form of the device illustrated in Figures 4, 5 and 6 the circulation is longitudinal of the plates. In order to accomplish this, the plates are divided into narrow strips 14 and wide strips 15. These are separated by the spaces 16 which are regulated by the holder.

Strips 14 and 15 are each formed with notches 17 and 18 respectively at the ends, and the end plates 19 and 20 are formed with the side flanges 21 adapted to enter said notches. The plates fit snugly together to form a tight joint and suitable gaskets 22 are inserted into the longitudinal slots formed by the notches 17 and 18 in the series of plates, thus making a fluid tight joint.

The end plates are shown formed with ducts 23 which divide the interior of the radiator in such a way that the fluid flowing in at the base flows upwardly between a series of the plates and passing into a pocket in the top plate, it is returned downwardly through another series. This may be continued throughout the length of the radiator or if desired the fluid may flow directly in at the bottom and pass upwardly through the entire area.

A construction such as described presents an extremely large radiating area for a comparatively small bulk which is highly desirable particularly in the heating of houses on account of the saving in space.

What I claim as my invention is:

1. A radiator, comprising, a plurality of thin flat metal plates each having perforations arranged adjacent to one side, said plates being placed face to face with the wider portions extending at opposite sides and the perforations being arranged in overlapping communication.

2. A radiator, formed of a plurality of flat plates of thin sheet metal each being formed with a rectangular perforation extending longitudinally for the major portion of its length, said plates being placed together with the perforations in overlapping register forming a zig-zag passage, the outer portions of the plates being spaced apart.

3. A radiator, comprising, a plurality of thin flat plates of metal each being perforated longitudinally, a base formed with a channel therein, said plates being placed upon said base with the longitudinal perforations in overlapping register and the plates projecting alternately on either side of the base, and a cap having a longitudinal channel adapted to communicate with the zig-zag passage formed by the perforations in the series of plates arranged between the base and the cap.

4. A radiator, comprising, a base having a channel therein, a plurality of thin flat plates of heat conducting material perforated and placed together in alternating arrangement to project on either side from the base the perforations forming a closed passage connecting with the channel in the base, the inward edges of said plates being arranged in spaced relation the one to the other, and a cap closing the top of said closed passage and sealing the plates.

ALEXANDER T. STUART.