July 9, 1929. C. T. MORSE 1,719,847

METHOD OF FORMING RADIATORS

Original Filed Feb. 28, 1927 2 Sheets-Sheet 1

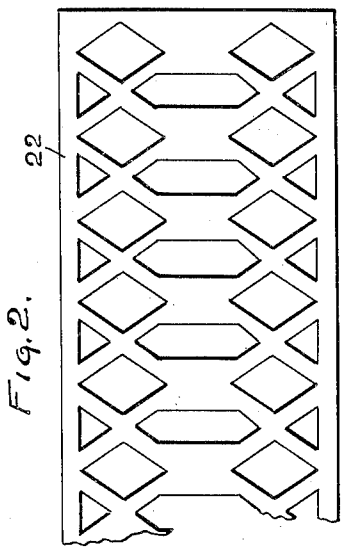


Fig. 2.

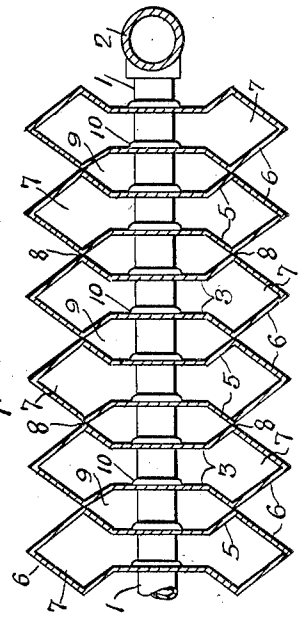


Fig. 3.

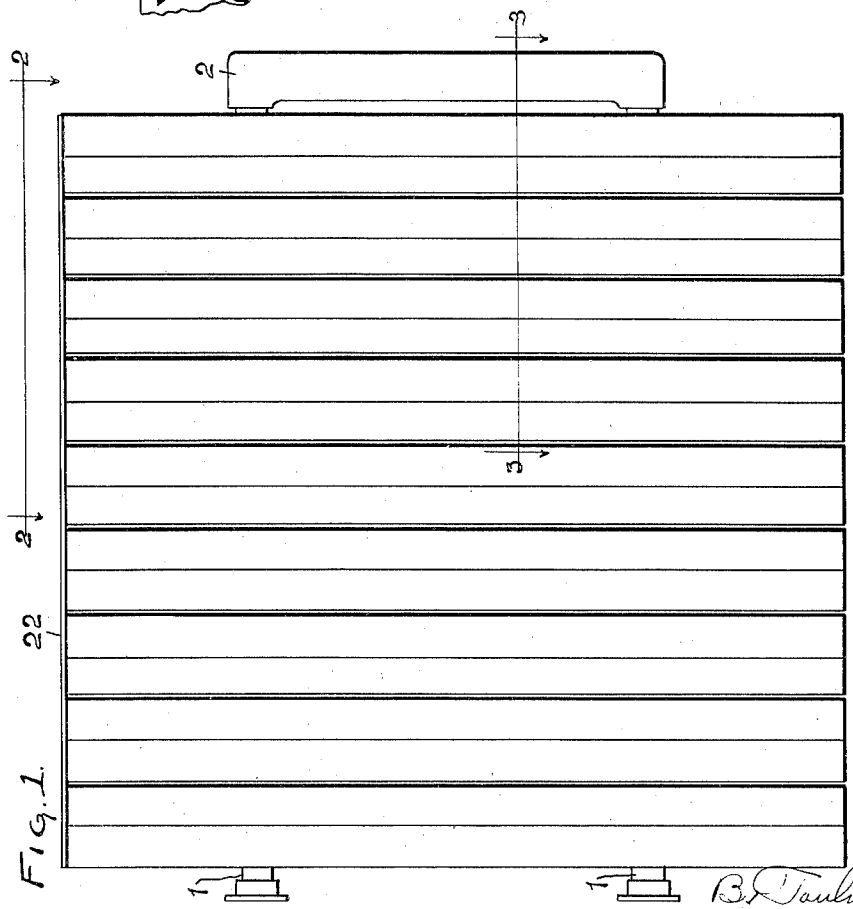


Fig. 1.

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Fig. 4.

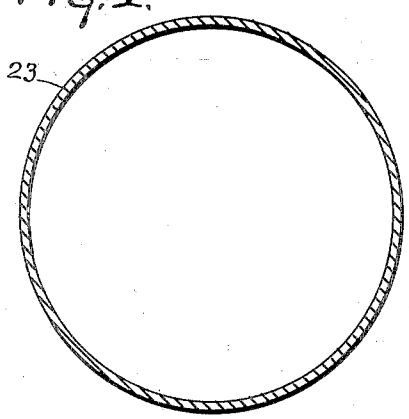


Fig. 5.

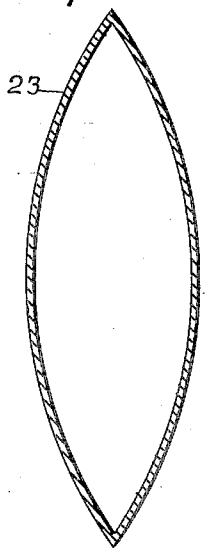


Fig. 6.

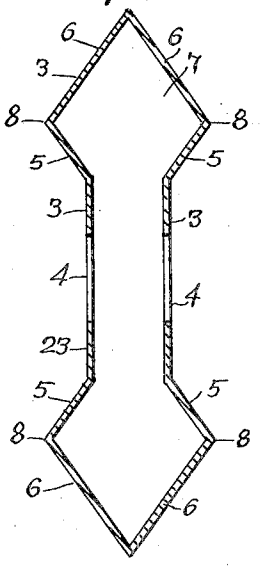


Fig. 7.

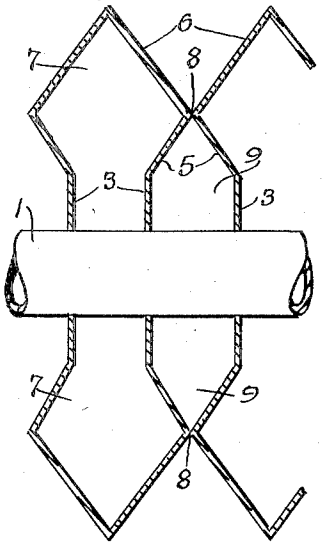


Fig. 8.

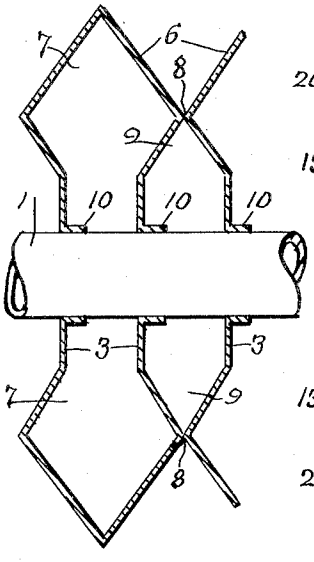
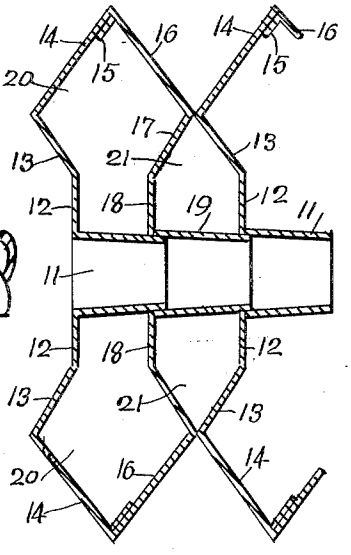


Fig. 9.



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Patented July 9, 1929. 1,719,847

UNITED STATES PATENT OFFICE.

CLARK T. MORSE, OF DETROIT, MICHIGAN, ASSIGNOR, BY MESNE ASSIGNMENTS, TO AMERICAN BLOWER CORPORATION, OF DETROIT, MICHIGAN, A CORPORATION OF DELAWARE.

METHOD OF FORMING RADIATORS.

Original application filed February 28, 1927, Serial No. 171,705. Divided and this application filed August 12, 1927. Serial No. 212,515.

My invention relates to radiators and in particular to drawn non-ferrous radiators, and is a division of my application, Serial No. 171,705, filed February 28, 1927.

It is the object of my invention to provide a method of forming a non-ferrous radiator with high radiating capacity in which there will be main passageways in one direction for the heating or cooling medium and confined air passageways arranged in conjunction with the cooling or heating medium passageways arranged in a diverse or transverse direction.

It is my object to provide a method of forming a close fitting between the two types of passageways to facilitate the radiation between the parts, the air and the heating or cooling medium being employed.

It is desirable but not essential to have such parts as nearly as possible made of homogeneous material without seams.

Referring to the drawings:

Figure 1 is a plan view of a radiator embodying these features;

Figure 2 is a plan view of a blank utilized for forming a perforated end member for the radiator;

Figure 3 is a section on the line 3—3 of Figure 1 showing the arrangement of the transverse tubular passageways with respect to the heating or cooling medium passageways;

Figure 4 is a section through a tubular member;

Figure 5 is a section through the tubular member formed into an elliptical shape in section;

Figure 6 is a section through the tubular member as it is formed in its final form;

Figure 7 illustrates in section such tubular air passageway members arranged on a heating pipe without flanges;

Figure 8 is a similar section with flanges;

Figure 9 is a section showing a two-part construction which when assembled forms both the air passageway and the heating and cooling passageway from the two parts.

Referring to the drawings in detail, 1 refers to a heating or cooling medium pipe, any number of which may be employed. I have shown a pair of such pipes in the radiator for the purpose of illustration, connected together at one end by the transverse member 2, a header.

Threaded on each of these pipes is a series of parallel, transversely-arranged air conveying pipes of special configuration.

For the purpose of forming such pipes, I first select an ordinary drawn tubing 23 preferably of non-ferrous material which is formed into an elliptical shaped pipe shown in Figure 5 and is thereafter formed with a pair of intermediately-disposed parallel sides 3 having openings 4 for receiving the pipe 1 and on either end of these sides 3 expanded portions consisting of an outwardly directed wall 5 and an inwardly directed wall 6 forming a head which is substantially diamond-shaped in section.

When these tubes having the diamond heads and parallel sides are threaded upon the pipes 1 they not only form air passageways above and below the pipes designated 7 but also their adjoining edges 8 form passageways 9 for the guidance of air over the pipes 1.

If desired, the openings 4 may have sleeves formed from the side walls 3, said sleeve being designated 10 forming broader bearing and contact surfaces on the pipes 1 for facilitating and improving the radiation and improving the rigidity of the structure.

In the event it is desired to make the transverse heating pipes and the air conveying passageways out of continuous pieces of stock, I select flat stock and form in such stock centrally thereof tapered thimbles 11 at right angles to the central flat portions 12, such thimbles 11 being opened at both ends. The flat portions 12 are bent up as at 13 at an angle to the flat portion 12 and the free ends of the sheet are bent outwardly at an angle to form the member 14 on either side of the sheet.

This member 14 overlaps a flange 15 formed on the end of a similar angular sheet margin consisting of the portions 16 and 17 bent in the reverse direction to the portions 13 and 14. A central portion 18 is provided which has its thimble 19 adapted to receive the thimble 11 interiorly thereof a portion of the thimble's length.

Thus, by forming a series of successive flat sheets, I am enabled to provide a passageway for the heating or cooling medium through

the pipe formed by the thimbles 11 and 19 and a transverse air passageway, such as 20, through the sheets joined together along the flanges 15 and a third transverse air passageway, designated 21, between the exterior of such sheets and the exterior of the thimble 19.

It will be understood that the headers can be made of any desired material either drawn tubings or castings and of any shape desired.

The header 2 is used simply to make a circuit for the steam dripping. The radiator can be placed in any position. The interlocking structure shown provides for great rigidity with corresponding light weight.

The secondary tubes with the diamond-shaped ends form air chimneys for the induction of the heated air, while at the same time, the exterior of the radiator provides a maximum of radiation surface both internally and externally and a neat, attractive appearance, permitting the radiator to be used in installations which have heretofore been impossible because of the appearance of other types of radiation.

The plate shown in Figure 2 and generally designated 22 is so formed as to fit over the ends of the diamond-shaped tubes, if desired, to present a neat appearance.

It will be observed that the sleeves 10 fit closely upon the tubing 1. I find that it is desirable in some instances to form these flanges on the tubing 1 into a close joint by drawing a tool through the tubing 1 and expanding it against the plates 3 so as to form the collars 10 providing the flange construction shown. Such connections may be brazed if desired.

It will be understood that I desire to comprehend within my invention such modifications as may be necessary to adapt it to varying conditions and uses.

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

1. In a process of forming radiator tubes, selecting a tubing circular in section, forming the tubing so that it is elliptical in section with oppositely disposed sharp edges, and then forming the tubing with inwardly disposed spaced parallel sides and heads on either side having angular side corners on either side of the oppositely disposed sharp edges of the tubing, forming heads on either side substantially diamond-shaped in cross section.

2. In a process of forming radiator tubes, selecting a tubing circular in section, forming the tubing so that it is elliptical in section with oppositely disposed sharp edges, and then forming the tubing with inwardly disposed spaced parallel sides and heads on either side having angular side corners on either side of the oppositely disposed sharp edges of the tubing forming heads on either side substantially diamond-shaped in cross section, threading said tubular member on a transverse heat conveying member and expanding said heat conveying member for deforming the portions of the tubular member adjacent thereto to secure a tight joint therebetween.

In testimony whereof, I affix my signature.

CLARK T. MORSE.