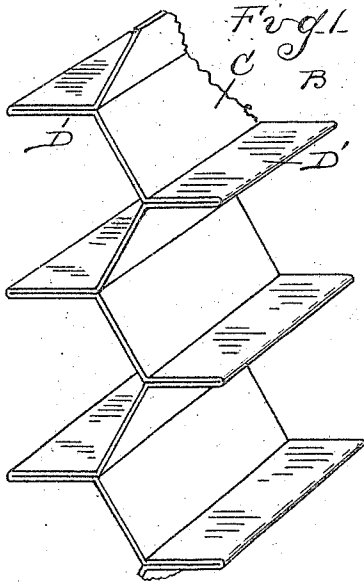
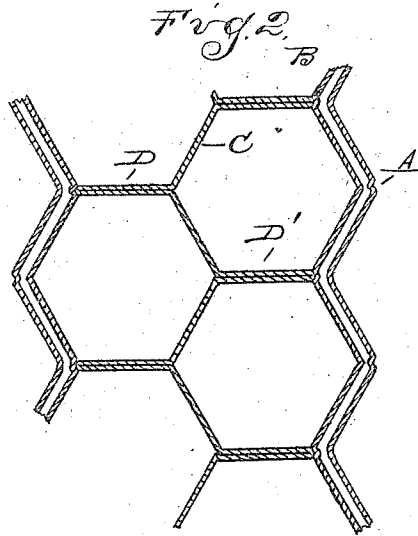
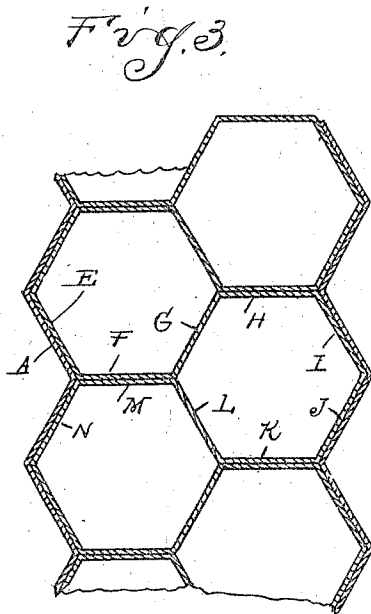
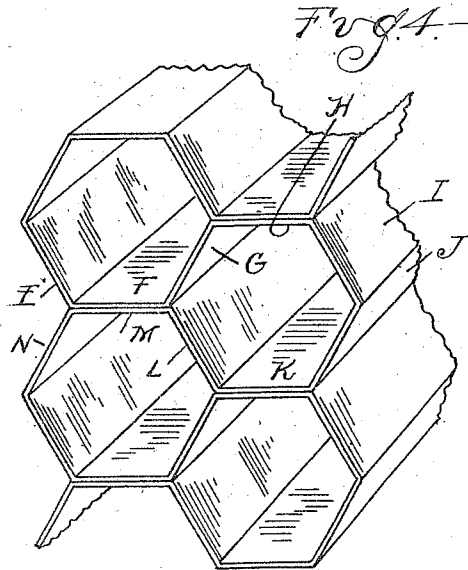


J. A. HINGER.
RADIATOR.

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1,234,166.

Patented July 24, 1917.



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UNITED STATES PATENT OFFICE.

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RADIATOR.

1,234,166.

Specification of Letters Patent.

Patented July 24, 1917.

Application filed April 7, 1916. Serial No. 89,585.

To all whom it may concern:

Be it known that I, JOHN A. HINGER, a citizen of the United States of America, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Radiators, of which the following is a specification, reference being had therein to the accompanying drawings.

10 The invention relates to radiators of that type in which the water-circulating tubes are provided with radiating fins, so fashioned as to produce the appearance of a cellular structure. The invention comprises 15 the novel construction of the fins and associated tubes as hereinafter set forth.

In the drawings:

Figure 1 is a perspective view of one of the fin constructions;

20 Fig. 2 is a section showing the same applied to the radiator;

Fig. 3 is a view similar to Fig. 2 showing a modified construction; and

25 Fig. 4 is a perspective view of the fin construction of Fig. 3.

A are the water tubes, which are of a zigzag form, extending vertically between top and bottom headers (not shown), and in parallelism to each other. The spacing between tubes is such as to provide for two 30 adjacent vertical rows of cells, preferably of hexagonal form, and these cells are partially formed by a radiating fin bent from a single metal strip.

35 In the construction shown in Fig. 1, the fin is formed by a strip B, fashioned to form a zigzag central portion C and return-bent or two-ply portions D and D', extending from the apices of the zigzag portion laterally in opposite directions. The proportion 40 is such as to form four sides of the hexagonal cells on opposite sides of the central portion C, the remaining two sides of said cells being formed by the zigzag water tubes A. The fin B is then attached to the 45 tubes A by soldering at the points of contact, and will produce the appearance of a cellular structure.

50 With the modified construction shown in Figs. 3 and 4, instead of bending the fin strip as just described, it is bent back and

forth transversely between the water tubes, each transversely-extending portion being fashioned to form three sides of each of two 55 cells in adjacent vertical rows, while the return transverse portion forms the complementary three sides of one of said cells and three sides of a third cell. Specifically, the strip is bent to form the sides E F G H I in one transversely-extending portion, and the 60 sides J K L M N in the next succeeding or return-bent transverse portion. The angles of these sides in relation to each other are such as to form hexagonal cells, which brings the sides F and M in parallelism and 65 in contact with each other, while the sides E and N contact with one of the zigzag water tubes A and the sides I and J with another zigzag water tube. When the radiator is 70 assembled and soldered, a good metallic contact is obtained by the relatively large amount of surface of the strip which is soldered to the water tubes.

While I have described a construction in which the cells are hexagonal, it is obvious 75 that the fin strip and tubes might be fashioned to form cells of other polygonal form.

What I claim as my invention is:—

1. In a radiator, the combination with parallelly-arranged zigzag water tubes, of 80 a fin strip therebetween bent laterally back and forth, each laterally-extending portion being fashioned to form three sides of each of two adjacent hexagonal cells, the complementary sides of one of which are formed 85 by an adjacent laterally-extending portion, and the outer sides of said cells fitting against the zigzag water tubes.

2. In a radiator, the combination with adjacent water-tubes, of a fin strip therebetween bent laterally back and forth, each 90 laterally extending portion being fashioned to form one half of each of two adjacent cells, the complementary halves of said cells being formed by adjacent laterally extending 95 portion.

3. In a radiator, the combination with adjacent water-tubes, of a fin strip therebetween bent laterally back and forth, each two adjoining laterally extending portions 100 being fashioned to jointly form a polygonal cell and to respectively form halves of two

adjacent cells, the water-tubes being zig-zaged to conform to the polygonal cell walls.

4. In a radiator, the combination with adjacent water-tubes, of a fin strip bent later-
5 ally back and forth between said water-tubes, alternatively forming complete cells adjoining the respective water-tubes.

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

JOHN A. HINGER.

Witnesses:

JAMES P. BARRY,
ADELAIDE I. ADAMS.