No. 877,609. PATENTED JAN. 28, 1908.

M. STEINER.

RADIATOR FOR AUTOMOBILES.

APPLICATION FILED JULY 9, 1907.

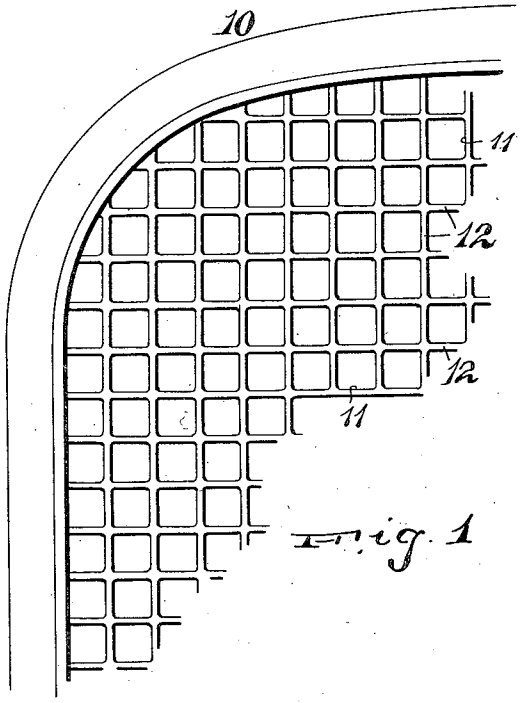


Fig. 1

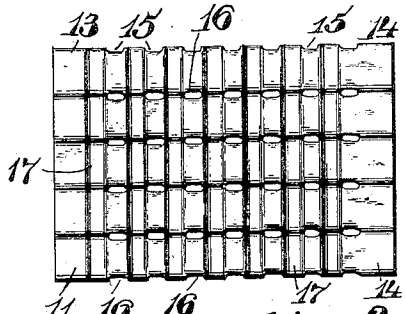


Fig. 2

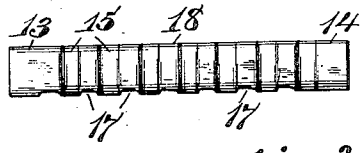


Fig. 3

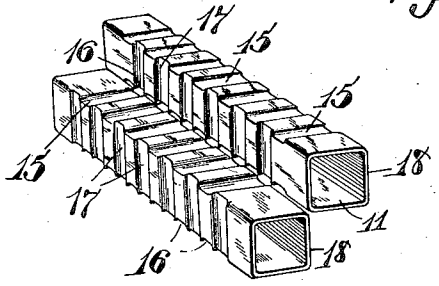


Fig. 4



Fig. 5

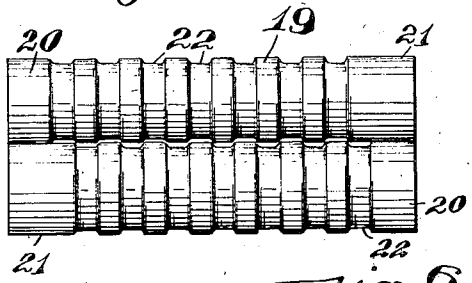


Fig. 6

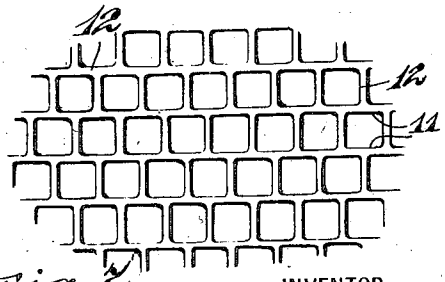


Fig. 7

WITNESSES:

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RADIATOR FOR AUTOMOBILES.

No. 877,609. Specification of Letters Patent. Patented Jan. 28, 1908.

Application filed July 9, 1907. Serial No. 382,929.

To all whom it may concern:

Be it known that I, MAX STEINER, a citizen of the United States, residing at Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Radiators for Automobiles; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to figures of reference marked thereon, which form a part of this specification.

This invention relates to an improved radiator for the use of cooling devices in automobiles, and is adapted to provide a radiator through which the air passes, the structure being made up of a series of tubes, and the spaces between the tubes furnishing the channel through which the water passes.

The device consists in supplying the tubes with depressions or recesses in the sides, or transversely, these spaces being the means by which the water circulates, the other portions of the tubes being adapted to contact to make tight joints, whereby very little solder is used to join them on their ends. The preferred form of indenting or recessing the tubes, is to make a freer channel in a horizontal direction between the tubes, so that the passage of the water from the top to the bottom of the radiator, which is common in these radiators, is delayed, and the water becomes thoroughly cool while passing through the radiator.

The device is illustrated in the accompanying drawing, in which

Figure 1 is a front view of a portion of a radiator, and Fig. 2 is a side view of some of the tubes. Fig. 3 is a top view of one tube, and Fig. 4 is a perspective view of two of the tubes showing the preferred disposition of the recesses. Fig. 5 is a face view, and Fig. 6 is a side view of modified forms of tubes. Fig. 7 is a face view showing an arrangement of the tubes in their relation to one another, slightly different from that shown in Fig. 1.

The radiator is composed of a suitable casing 10, and the tubes 11 are nested with their ends soldered, as at 12 in Fig. 1, so that the ends of the tubes, or rather the spaces between them, are made water tight. The air is designed to pass through these tubes and keep them cool.

The tubes are preferably made square, although they may be made six-sided, or any formation that is adapted for this purpose, or they might be made circular in cross-section, as shown in Fig. 5. The ends 13 and 14, of the tubes, are made of the same size so that they abut to form a comparatively tight joint between them, and the top and bottom edges of the tubes are supplied with recesses or channels 15 and 16 respectively, these being adapted to abut and form a free channel for the passage of water. One of the perpendicular sides of each tube 11 is supplied with channels or recesses 17, which are vertically disposed and form a channel for the vertical passage of water. I prefer to make the other wall 18, of each tube 11, flat.

The arrangement that is thought to bring about the best results, is shown in Fig. 4 where the vertical channel 17, in each tube, fits up against the flat side 18 of the next tube, and this tends to partly obstruct and make the passage of the water, through the channel 17, of half the capacity of the horizontal passages formed by the channels 15 and 16. The portion of the channeled sides of the tubes that is not channeled, is flush with the ends so that the passage of the water is only through the channels. I prefer, in some cases, to arrange the tubes as shown in Fig. 7, whereby they are staggered or arranged out of alinement, in the adjoining layers, so that there is no direct vertical flow, even restricted as it is in Fig. 1, and the path of the water through the heater is made more circuitous. It will be seen, from this description, that the water is checked against a straight flow, and must, of necessity, traverse considerable cooling surface and is of a very much lower temperature after going through the radiator. If desired, I may make the tubes as shown in Figs. 5 and 6, each tube 19 being provided with an end 20 and an end 21, the two ends being made to register, or, as shown in Fig. 6, being placed in reverse position, in which case the channels 22 will not register, and will make a staggered longitudinal path for the water, besides the transverse or circumferential current.

Having thus described my invention, what I claim is:—

1. A radiator composed of a series of tubes for the passage of air, the contact of the

tubes on the ends being sealed, and the tubes having a series of transverse channels arranged to connect to form passages for the water.

2. A radiator composed of a series of tubes for the passage of air, the contact of the tubes on the ends being sealed, the tubes having a series of transverse channels to provide for the horizontal and the vertical passage of water between the tubes.

3. A radiator comprising a series of tubes having their contacting ends sealed, the tubes having transverse channels arranged between the ends, a portion of each tube being flat from end to end to partly obstruct the flow at that point.

4. A radiator comprising a series of tubes, the contacting ends of the tubes being sealed, the tubes being square in cross-section, and having a series of transverse channels for the passage of water, the channels being adapted to come in register.

5. A radiator comprising a series of square tubes, each tube having transverse channels on the top and bottom, and on one of the vertical sides.

6. A radiator comprising a series of square tubes, each tube having transverse channels on the top and bottom, and on one of the vertical sides, the vertical side of one tube being arranged adjacent to the vertically channeled side of the next tube.

In testimony, that I claim the foregoing, I have hereunto set my hand this 8th day of July 1907.

MAX STEINER.

Witnesses:
WM. H. CAMFIELD,
E. A. PELL.