C. H. MARTIN.

AUTOMOBILE RADIATOR.

APPLICATION FILED NOV. 12, 1914.

1,183,312.

Patented May 16, 1916.

2 SHEETS—SHEET 1.

Fig. 1.

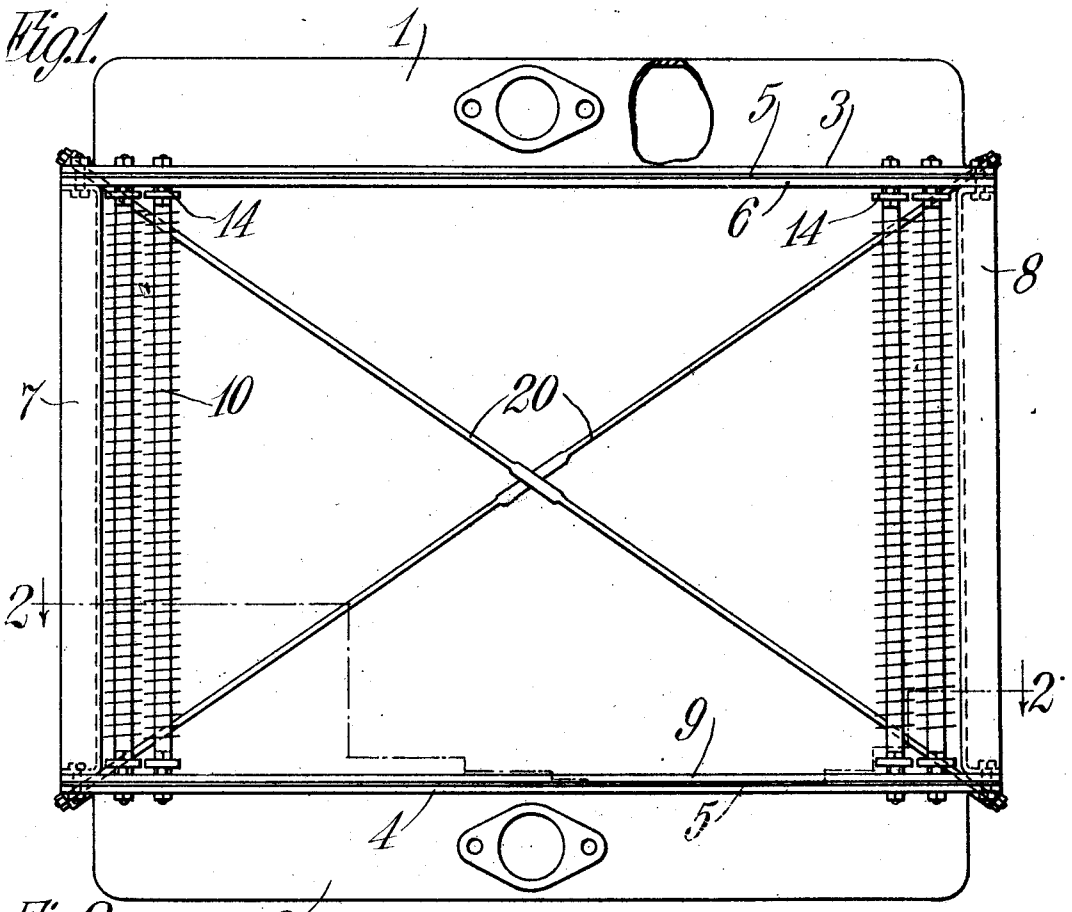
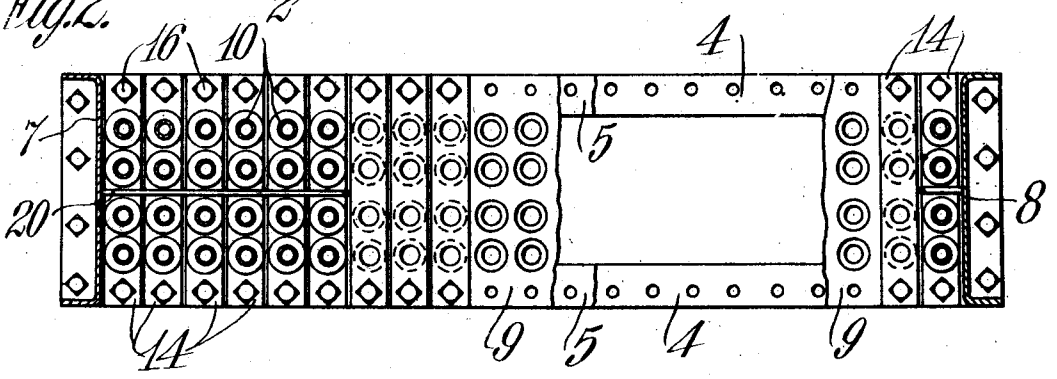


Fig. 2.



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2 SHEETS—SHEET 2.

Fig. 3.

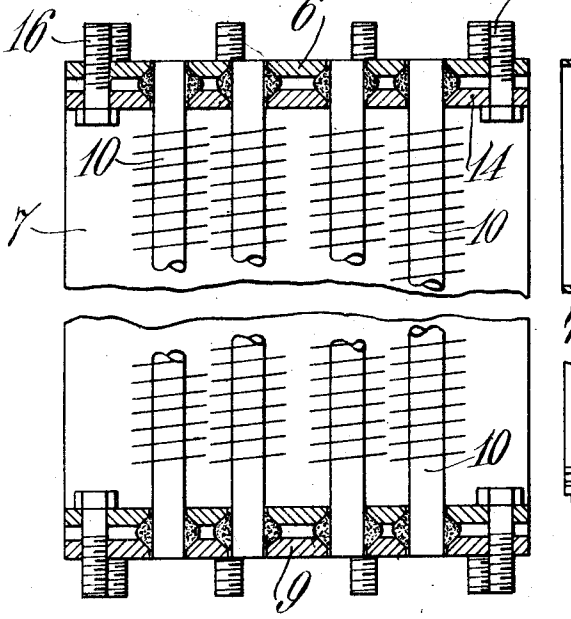


Fig. 5.

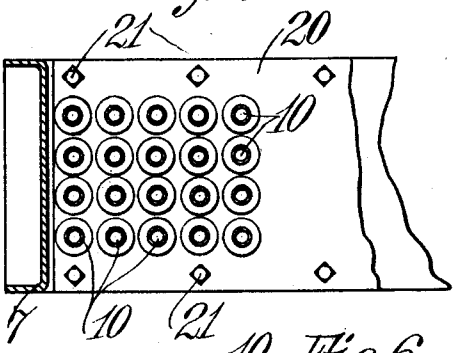


Fig. 6.

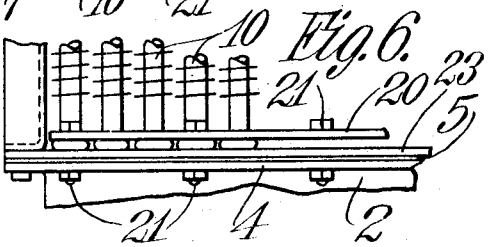


Fig. 4.

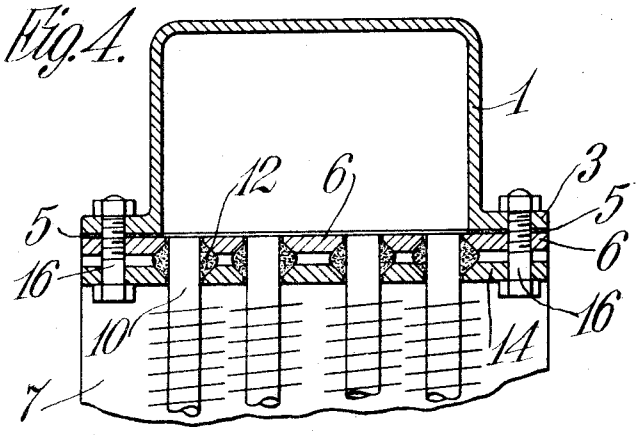
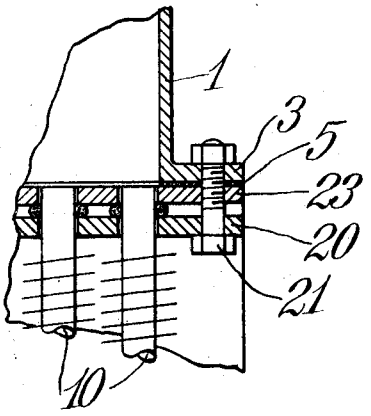


Fig. 7.



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AUTOMOBILE-RADIATOR.

1,183,312. Specification of Letters Patent. Patented May 16, 1916.

Application filed November 12, 1914. Serial No. 871,684.

To all whom it may concern:

Be it known that I, CHARLES H. MARTIN, a citizen of the United States of America, residing in the city of Springfield, county of Hampden, and State of Massachusetts, have invented certain new and useful Improvements in Automobile-Radiators, of which the following is a specification.

This invention relates to an improvement in radiators and particularly to radiators used with water cooled automobile engines.

An object of the invention is to provide a radiator, the parts of which may be put together, taken apart, and replaced more conveniently than heretofore.

Another object of the invention is to provide improved means for connecting and supporting the radiating members (as tubes) with the upper and lower header members or manifolds.

Other objects of the invention will appear in the detailed description and annexed claims.

The preferred form of my invention is shown in the accompanying drawings for the purpose of illustrating one way in which the invention may be carried out.

In the drawings: Figure 1 is a front elevation of an automobile radiator embodying the invention with parts removed; Fig. 2 is a composite longitudinal sectional view taken on the line 2—2 of Fig. 1, assuming the latter figure to be complete; Fig. 3 is a transverse sectional view of the radiator assembled and ready to receive the header members; Fig. 4 is a detail sectional view similar to Fig. 3 with a header member shown in place; Fig. 5 is a partial sectional plan view of a modified form of the invention; Fig. 6 is a partial front elevation of the same; Fig. 7 is a fragmentary vertical section of the same modification.

In the form of the invention shown, the radiator comprises, in general, upper and lower header members 1 and 2, and individual open-ended radiator pipes 10, communicating independently with each header member or manifold. The construction of the upper and lower header members and the manner of connecting and suporting the radiator pipes respectively thereto are the same. The construction and arrangement will be described with reference to the upper header member and this description will suffice for both.

This upper header member 1 is a box-like structure closed except for one side which is open. The open side is provided around its edge with an outwardly extending flange 3. A plate 6 is constructed to fit over the open side of member 1 and extends to the edge of flange 3. Packing 5 is placed between the plate and the flange 3. The open ended radiator pipes 10 pass through holes in plate 6 slightly larger than the pipes, and communicate with the interior of the header 1. These holes are countersunk on the entrance side to receive packing 12. The latter is jammed tightly around the pipes and into the countersunk holes of the plate 6 by means of adjustable cross bars 14. (It will be noticed that for convenience the radiator pipes 10 are arranged in transverse sets of four and these sets are arranged in a longitudinal series extending entirely across the radiator). This is best shown in Fig. 2 and one of the transverse sets is clearly shown in Fig. 4. Each cross bar 14 (see Figs. 2 and 4) is provided with countersunk holes (slightly larger than the pipes) to receive a transverse set of the pipes 10 and the packing 12 is seated in the countersunk spaces. Bolts 16 pass freely through opposite ends of each cross bar 14 and thread into opposite edges of the plate 6. These bolts when tightened force the adjustable cross bar 14, and thus packing 12, against the plate 6. Thus the packing 15 around each pipe 10 forms an effectual seal between the pipe and plate 6. These bolts 16 also fit loosely into holes in the flange 3 of the header 1 and the latter is secured to the plate 6 with the packing 5 therebetween by nuts, as shown in Fig. 4. The threaded engagement of the bolts 16 with the plate 6 permits the pipes 10 to be entirely assembled in the plate 6 before the header 1 is placed in position. It should be particularly noted that the ends of pipes 10, since they pass through holes in cross bars 14 and plate 6 slightly larger than the diameter of the pipes, are supported by the yielding packing 15. As the pipes are thus supported at the ends and nowhere else they are cushioned against all shocks. This I consider of especial importance in automobile radiator construction because it permits the use of readily removable units without the pipe connections being rendered leaky after use.

The construction and arrangement for connecting one transverse set of pipes 10 with the header member 1, described in

connection with Fig. 4, is identical for all sets of the longitudinal series indicated in Figs. 1 and 2. Moreover, the pipes 10 are secured to the lower plate 9 and the flange 4 of the lower header 2 is secured to the plate 9 in a manner identical with that already described.

The means for bracing and binding the assembled pipes into one strong unit will now be described. The flanged header members 1 and 2, and plates 6 and 9 are securely bound together at their opposite ends by the flanged bracing and supporting plates 7 and 8. These supporting plates or side members are bolted to and through plates 6 and 9 and the header members. To provide for twisting strains, the centrally arranged and diagonally crossed bracing rods 20 are provided, the ends of which pass through opposite ends of flanges 3 and 4 and have takeup nuts thereon.

The modified form of the invention shown in Figs. 5, 6 and 7 will now be described. The general arrangement of this modified structure is identical with that previously described. The main point of difference, however, lies in the provision of a single plate 20 secured in the manner described, by a relatively small number of bolts 21, to a plate 23, which latter corresponds to the plate 6 heretofore described. Thus the individual plates 14 are in this modification combined into a single element 20. In this connection it is to be noted that countersinking of the holes in the plates 6 and 14 is not absolutely necessary. I may, if I desire, omit this countersunk feature as shown in Figs. 5, 6, and 7, and employ simply the flat surfaces of the plates 20 and 23 to squeeze the packing 22 against the pipes 10. The holes in the plates 20 and 23 are larger than the pipes 10 so that the latter are resiliently supported by the packings 22. The structure shown in Figs. 5, 6, and 7 is shown to illustrate one way in which my device may be modified but it is to be understood that the preferred form of my invention is embodied in Figs. 1 to 4 inclusive.

It is to be noted that stuffing boxes, flanged joints, ground joints, and all the other similar devices commonly employed in radiators are not necessary in my device. On the contrary the joint between the pipes 10 and the plates 6 and 9 is an extremely simple one. Thus, due to its simplicity, the structure is comparatively inexpensive to manufacture. Moreover, although the joint between the pipes 10 and the plates 6 and 9 is simple, it is very efficient and entirely suitable for radiators, particularly where ordinary pressures are employed. Furthermore, the connection between the pipes and the plates is one which does not readily loosen, since the pipes are supported primarily by the packing and only secondarily by the plates 6 and 9. Thus vibrations of the plates 6, and 9 are not readily transmitted to the pipes 10 through the yieldable packing 12, and due to this yieldable support the pipes do not become loosened and a water tight joint is maintained. Constant attention to prevent leakage is thereby rendered unnecessary with my radiator.

Another marked advantage of my structure lies in the fact that the tubes 10 may all be assembled in a rigid frame, comprising the members 6, 7, 8, and 9, before the header members 1 and 2 are put in place. Thus each individual joint is accessible for inspection before the members 1 and 2 are applied. After the headers 1 and 2 have been applied and in event of a defective pipe 10 only one group comprising four pipes need be removed from the radiator to repair the defect. Assuming one pipe 10 to be defective, a pair of bolts 16 at the top and the corresponding pair at the bottom of the radiator are loosened. The plate 14 then drops freely away from the plate 6 and the group of four pipes may thereafter be pushed downwardly so that their ends lie slightly within the lower header 2. This action withdraws the upper ends of one set of pipes 10 and frees them from the top plate 5, after which they may be conveniently removed. A new pipe 10 may then quickly and easily replace the defective pipe and the group be again secured to the plates 6 and 9 by reversing the procedure just described.

Thus my radiator is arranged with a plurality of readily removable radiating units and each radiating pipe is resiliently supported to eliminate shocks and vibrations. It is recognized that many modifications may be made in the structure herein described without departing from the scope of my invention which is defined in the appended claims.

What I claim is:

1. An automobile radiator comprising two header members and a set of radiator pipes to connect the header members for the circulating medium, the header members having associated therewith yielding elements to form the sole contacting supports for the radiator pipes and means to hold said elements in tight frictional supporting contact with the pipes and also to seal the header member over the area surrounding the open ends of the several pipes.

2. An automobile radiator comprising two header members and a set of radiator pipes to connect the header members, a sealing plate for each header member having holes for the adjacent ends of the pipes to loosely pass through, a ring of packing material surrounding the end of each pipe, and

means operable in conjunction with the plate to force and hold the packing material of a plurality of pipes into sealing position between said plate and pipes and into yielding supporting contact with the ends of the pipes, the latter being spaced from the walls of the holes whereby the pipes are yieldingly supported at their ends and held in position to connect the two header members by tight joints therewith.

3. In an automobile radiator a header member, a set of radiator pipes to connect with the header member, a sealing plate for said member having holes for the ends of the pipes to loosely pass therethrough, a ring of packing material surrounding each pipe, and means operable in conjunction with the plate to force and hold the packing material of a plurality of pipes into sealing position between said plate and pipes, the latter arranged in concentrically spaced relation with the walls of said holes, whereby said pipes are supported solely by said packing material in a yieldable manner.

4. A radiator comprising two header or manifold members and a plurality of series of similarly arranged pipes to connect the header members, a sealing plate for each header member having holes countersunk on their outer faces for the adjacent ends of the pipes to loosely pass through, a ring of packing material surrounding each pipe seated in the adjacent countersunk ho , a bar for the corresponding ends of each series of pipes provided with holes through which the pipes loosely pass, said holes being countersunk on the face adjacent the sealing plate and adjustable means to force each bar toward the adjacent header member thereby to tightly seat the packing material in the countersunk spaces and around the ends of the pipes in sealing and yieldingly supporting relation with the header members the combination being characterized by the ready and independent removability of each series of pipes, the yielding supports for the pipes and the adjustable sealing means for the pipe connections.

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