C. W. DIPPERT.

AUTOMOBILE RADIATOR.

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1,045,267

Patented Nov. 26, 1912.

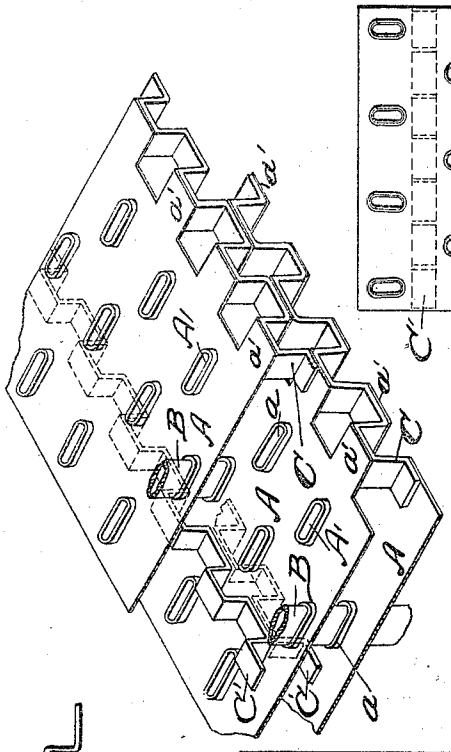

Fig. 2

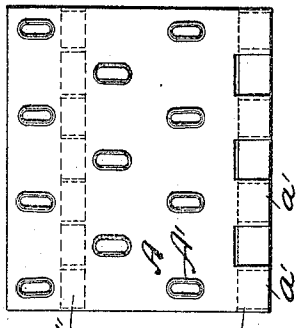

Fig. 3

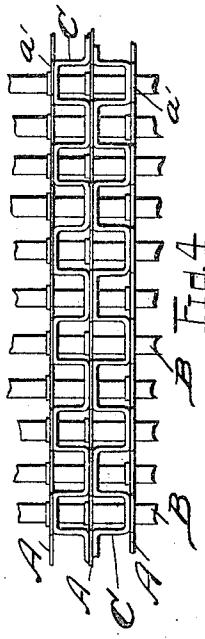

Fig. 4

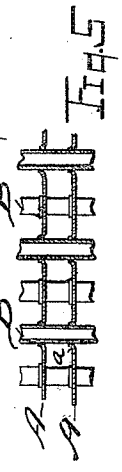

Fig. 5

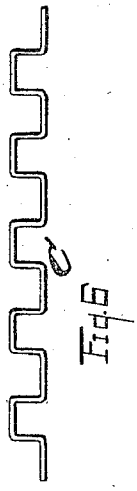

Fig. 6

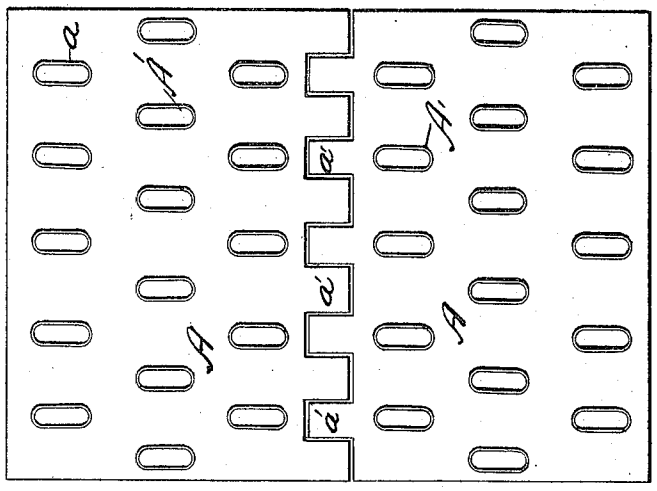

Fig. 1

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UNITED STATES PATENT OFFICE.

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AUTOMOBILE-RADIATOR.

1,045,267. Specification of Letters Patent. Patented Nov. 26, 1912.

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To all whom it may concern:

Be it known that I, CHARLES W. DIPPERT, citizen of the United States, residing at Detroit, county of Wayne, State of Michigan, have invented a certain new and useful Improvement in Automobile-Radiators, and declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to an improvement in automobile radiators, shown in the accompanying drawings and more particularly described in the following specification and claims.

One of the objects of my invention is to construct a radiator having a large radiating surface, the tubes being relatively broad and narrow that the volume of water circulating through the tubes may be spread over a maximum radiating surface;—it being possible to provide more tubes of this form throughout a given area than if they were cylindrical in cross-section.

Another object is to provide a staggered arrangement of the tubes that the air in passing between them may cover the entire surface of each tube.

Another object is to provide crenelated or indented bridge strips separating the fins to which they are soldered,—the arrangement being such that the outer set of bridge strips are flush with the outer surface of the radiator and in front of the first row of tubes thereby protecting the tubes from accidental injury by presenting a substantially solid front, the combined edges of the bridge strips and fins offering great resistance to any accidental blow the radiator may be called upon to sustain.

A further object is to arrange the crenelated strips so as to present when assembled, a cellular wall through which the air may rush, thus insuring a more even distribution of the air currents.

Another object is to construct the fins in such manner as to insure the greatest economy in the use of material,—the fins with their projecting tongues, which are lodged between each pair of the front row of bridge strips, being cut from a single blank, the tongues interlocking thus saving considerable material, as clearly indicated in Fig. 1.

Another object is to assemble the fins, tubes, and bridge plates in such manner that they may be readily soldered to form a single unit without danger of the bridge strips being displaced or the fins improperly spaced.

Other advantages and improvements will hereafter appear.

In the drawings:—Figure 1 is a plan view of a pair of fins cut from a single plate,—the projecting tongues of each fin interlocking to provide against waste in cutting the blank. Fig. 2 is a fragmentary perspective view of several superimposed fins held in spaced relation by crenelated or indented bridge strips placed between the fins. Fig. 3 is a plan view of one of the fins, the location of the bridge strips being indicated in dotted lines. Fig. 4 is a fragmentary front elevation of the radiator. Fig. 5 is a vertical cross-sectional view through a fragment of the water circulating tubes and the fins surrounding the same. Fig. 6 is an elevation of a fragment of one of the bridge strips.

Referring now to the letters of reference placed upon the drawings:—A indicate fins, perforated for the passage of water tubes, inclosed within the wall (not shown) of the radiator;—the fins being provided with a plurality of elongated openings A′ arranged in staggered relation, having an upstanding bur *a* surrounding the openings.

B denotes a plurality of water circulating tubes projecting through the several openings of the superimposed fins. The front edge of the fins of the radiator is notched to form tongues *a′* which respectively rest upon and between the crenelated bridge strips C,—the outer edge of the latter being flush with the edge of the projecting tongues *a′* of the fins. Between the two rear rows of tubes and the several fins are similar bridge strips C′, the indentations in said bridge strips being preferably in line with those in the front though this is not essential. The required number of fins, bridge strips, and water tubes, having been assembled, the fins and strips are soldered together to form a single unit, by dipping or they may be attached together in any approved manner.

It will be noted that when the several fins are assembled, (their projecting tongues being lodged between the several bridge strips forming the front of the radiator), the parts may be clamped together thus materially simplifying the operation of soldering and thereby reducing the cost of manu-

facture. The rear set of bridge strips may also be flush with the outer edge of the fins though I prefer to place them in front of the last row of tubes as indicated in the drawings, for the reason that the tubes serve as a support for the bridge strips in the act of dipping them in the solder. While it is not essential that all the tubes should be soldered to the fins it will be apparent that the rear row of tubes will be soldered to the fins by the operation of soldering the rear row of bridge strips to the fins.

In perforating the fins for the passage of water tubes, I prefer to surround the openings with a slight bur *a*, as indicated in the drawings, the purpose being to present a relatively large surface abutting the tubes thereby relieving the tubes of any chance of their being sheared or cut by the edge of the fins through some accidental blow the fins may receive, it being borne in mind that the fins and tubes are formed of relatively thin material, which increases the liability of accidental shearing.

It will be noted that the edges of the superimposed fins and bridge strips present a very strong and rigid structure which serve as an armor for the water tubes, protecting them against injury from an accidental blow that might otherwise destroy or injure their efficiency. The cellular form of the radiator front, due to the peculiar form and manner of assembling the indented bridge strips, also serves to divide up the air currents causing them to circulate around the tubes greatly adding to the efficiency of the radiator. By forming the tubes in an elongated shape and arranging them in staggered relation, a greater number of tubes may be located in the same area than would be possible if the ordinary form of circular tubes were employed. So also the staggered arrangement insures the air coming in contact with each tube and circulating completely around it in passing through the radiator.

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

1. In a radiator, a plurality of water tubes, a plurality of superposed fin plates provided with perforations to receive the water tubes, the outer edge of each fin plate being notched to form tongues with the tongues of each fin plate being disposed out of alinement with the next fin plate, angularly corrugated spacing strips interposed between each fin plate, each corrugated strip resting upon the tongues of one of the fins with the tongues of the next above fin resting on the corrugated strip.

2. In a radiator, a plurality of water circulating pipes arranged in rows, a plurality of radiating fins spaced apart and perforated to admit the projection of the pipes through said fins, and a series of crenelated bridge strips each interposed and confined between adjacent fins and secured thereto to maintain the fins in spaced relation, one set of said bridge strips being located in front of the outer row of water tubes and flush with the front of the radiator.

3. In a radiator, a plurality of water circulating pipes arranged in rows, a plurality of perforated fin plates spaced apart embracing said pipes, the outer edges of said plates being notched to form projecting tongues, and crenelated bridge strips interposed between said fin plates and secured thereto, one set of said bridge strips being engaged to the projecting tongues of the fin plates and in front of the front row of water tubes.

4. In a radiator, a plurality of water circulating pipes arranged in rows, a plurality of perforated fin plates spaced apart embracing said pipes, the outer edges of said plates being notched to form projecting tongues, and crenelated bridge strips interposed between said fin plates and secured thereto, one set of said bridge strips being engaged to the projecting tongues of the fin plates and in front of the front row of water tubes, the other set being located in front of the back row of water tubes, substantially as and for the purpose described.

5. In a radiator, a plurality of water circulating pipes elongated in cross-section, a plurality of fin plates spaced apart and perforated for the passage of the pipes, and crenelated bridge strips interposed between the fin plates, each bridge strip being confined between adjacent plates and soldered thereto to maintain and support the fin plates in spaced relation, some of the bridge strips being flush with the front of the radiator.

6. In a radiator, a plurality of pipes arranged in rows, a plurality of radiating plates spaced apart and perforated to receive the pipes, rows of crenelated bridge strips interposed between the fin plates, each bridge strip being confined between adjacent plates and soldered thereto to maintain and support the fin plates in spaced relation, said crenelated strips being assembled to form a cellular wall in front of the front row of tubes whereby the air currents passing through the radiator may be evenly directed and distributed throughout and around the several pipes.

7. In a radiator, a plurality of circulating water pipes, a plurality of spaced radiating plates provided with perforations to receive the pipes, each radiating plate being entirely out of contact with adjacent plates, rows of crenelated spacing strips interposed between the radiating plates to maintain the latter in spaced relation, the edges of the strips of the front row of spacing strips being flush with the front of the radiator.

8. In a radiator, a plurality of circulating

water pipes, a plurality of spaced radiating plates embracing the pipes, and disposed at right angles thereto, and a plurality of corrugated spacing strips interposed between each plate and disposed in the same direction as the plates and at right angles to the water pipes.

In testimony whereof, I sign this specification in the presence of two witnesses.

CHARLES W. DIPPERT.

Witnesses:
GRACE E. WYNKOOP,
SAMUEL E. THOMAS.