M. GAL.

RADIATOR.

APPLICATION FILED APR. 24, 1919.

1,378,103.

Patented May 17, 1921.

2 SHEETS—SHEET 1.

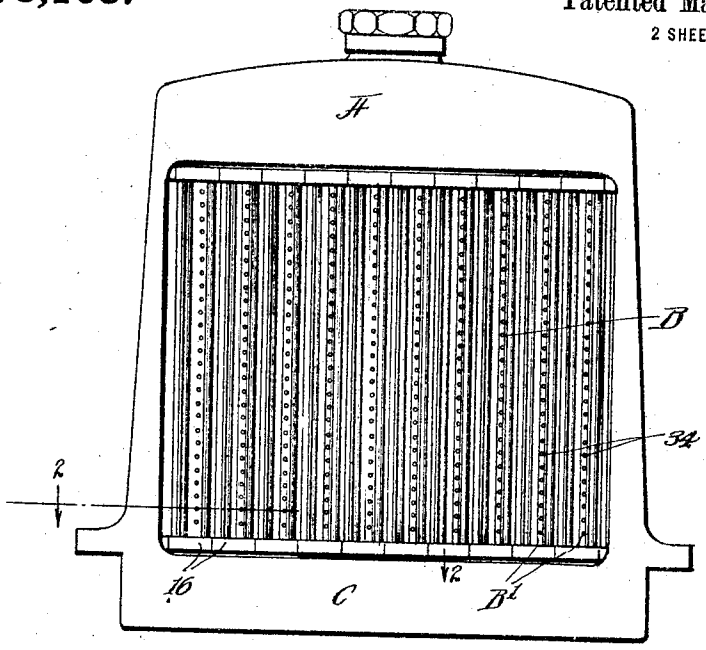


Fig. 1.

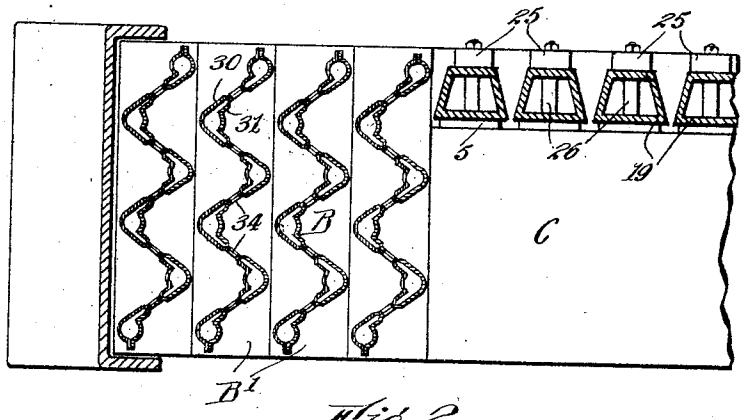


Fig. 2.

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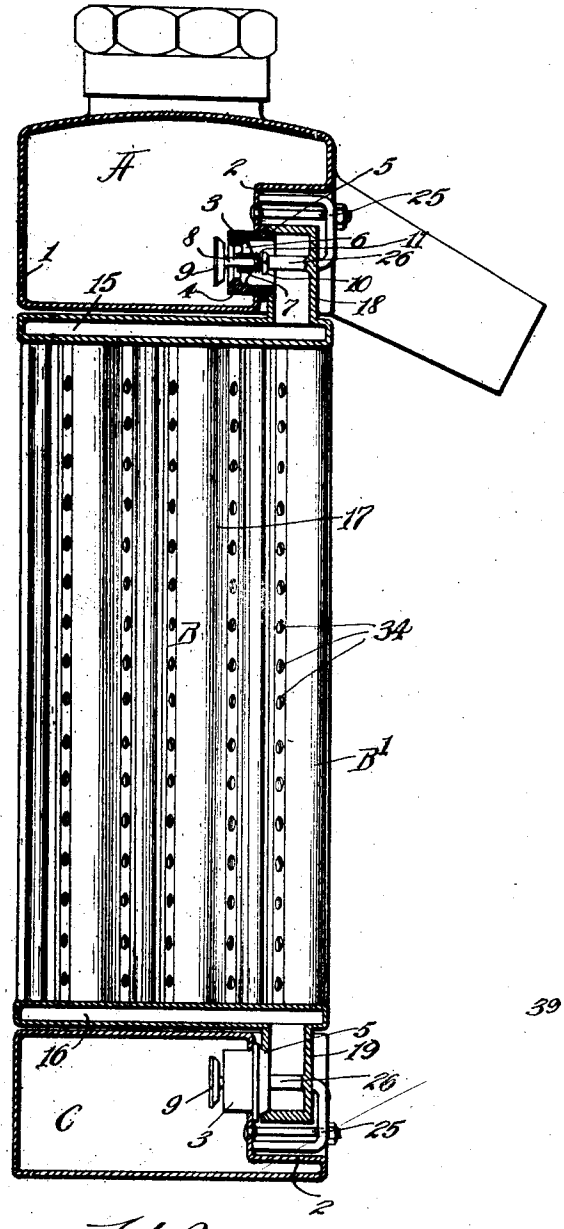


Fig. 3.

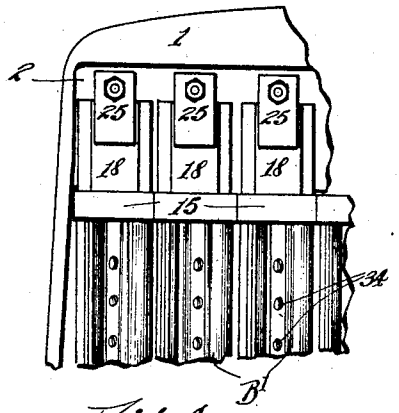


Fig. 4.

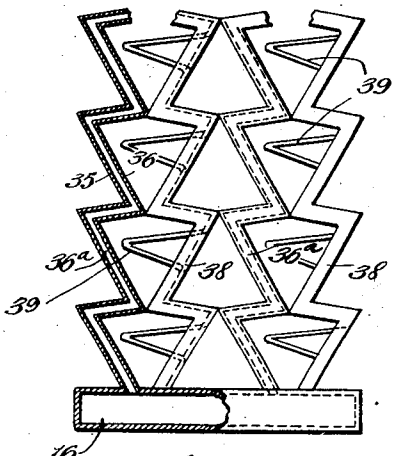


Fig. 5.

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UNITED STATES PATENT OFFICE.

MATHIAS GAL, OF CLEVELAND, OHIO.

RADIATOR.

1,378,103. Specification of Letters Patent. Patented May 17, 1921.

Application filed April 24, 1919. Serial No. 292,311.

To all whom it may concern:

Be it known that I, MATHIAS GAL, a subject of the Government of Austria, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Radiators, of which the following is a specification.

This invention relates to radiators for power propelled vehicles; and has for its objects the provision of a device which will be simple and efficient in operation, one which, by the peculiar construction employed, may have certain damaged units removed for repairs, leaving the remaining units to be used upon the vehicle.

Further objects are in the provision of means which will automatically shut off the cooling fluid when certain sections are removed; the provision of cooling tubes which may be cheaply manufactured and efficient in operation. Further objects will become apparent in the following description and claims.

In the drawings Figure 1 is a front elevation of a radiator constructed in accordance with my invention. Fig. 2 is a horizontal section on the line 2—2 of Fig. 1; Fig. 3 is a vertical section through the radiator; Fig. 4 is a rear elevation of one corner of the radiator and Fig. 5 is a detail view of a modified form of cooling tube.

The invention consists of three main sections or parts indicated as A, B and C respectively. The sections A and C are reservoirs or headers for the cooling fluid, the top section A containing fluid of higher temperature than the lower one C, the temperature of the fluid having been lowered previous to its entrance into the reservoir C by flow through the tubes of the section B.

The section A comprises a tank 1 having at the back thereof a recess 2 in the vertical wall of which are a plurality of apertures for the reception of bushings 3, which may be soldered or otherwise secured thereto. The bushing 3 has at its inner end, or that end which extends within the interior of the reservoir, a tapered valve seat 4, and at its opposite end has a reversely tapered extension 5, between which a spider 6 cast integral with the bushing supports a bearing 7 for the stem 8 of the valve 9 to slide therewithin. A collar 10 is secured to the stem 8 remote from the valve 9 and a compression spring 11 interposed between the bearing 7 and the aforesaid collar normally holds the valve closed. This recess and valve structure are duplicated in the rear wall of the section C.

The section B is composed of a series of units or sections B^1 clamped into place between the top and bottom reservoirs in a manner to be described. Referring to Figs. 2 and 3 it will be seen that each unit or section B^1 consists of two horizontal chambers 15 and 16, located at the top and bottom respectively, and connected by a series of tubes 17, formed of sheet metal in a manner to be described. Vertical tubular extensions 18 and 19 are formed on these chambers and are adapted to fit in the recesses 2 of the sections A and C. These extensions are closed at one end and have their open ends secured to the aforesaid chambers in any convenient manner. Tapered holes in the side walls of the extensions receive the tapered portions 5 of the bushings 3 and are securely fixed in position by a clamp of any suitable construction such as is indicated at 25. A horizontal stud 26 is cast integral with the extension 18 or 19 and registers with the stem 8 of the valve, and is of such length that when the units B^1 are clamped into place the valves are forced and held in open position until such time as the unit is removed for repairs, when the valve will be automatically closed as soon as the pressure exerted through the stud 26 and its adjuncts is removed.

It will be seen from the above that any one or as many of the units or radiator sections may be removed for repairs as necessary without causing the entire radiator to be removed from the vehicle, thus causing unnecessary expense and inconvenience in having the vehicle out of use during the time taken to make the necessary repairs.

Referring to Fig. 2 it will be seen that the radiating or cooling tubes for each unit or section are formed of two plates 30 and 31 of sheet metal in substantially zig-zag form, and arranged in pairs.

After being placed with certain portions in contact the plates are joined in any suitable manner as by soldering, and at the corners of the plates, tubes are formed by the concave bends on the plate 30 and the convex bends on the plate 31. These bends are alternately arranged and are substantially semi-circular in contour, so that when the

plates are joined the bends produce complete vertical tubes having a rectangular space extending tangentially from each side.

The intermediate parts of the plates fit closely only at their approximate centers where they are perforated as indicated at 34 and joined as by means of soldering.

The tubes are spaced apart, so that air passages are provided between, said passages communicating with each other through the openings 34. The tubes are preferably joined to the chambers 15 and 16 by soldering or by swaging.

In Fig. 5 I have shown a modified form of construction for the cooling tubes, consisting of two plates 35 and 36 bent into zigzag form horizontally and joined at their edges by means of soldering, the fluid percolating downwardly step by step through the passages 36^a formed by the plates. The one indicated at 38 is preferably a dummy tube having no fluid connection at its upper and lower ends, said tube having punched outwardly therefrom radiating fins 39 between the front and rear edges thereof. In practice I have found that if the said fins substantially touch the cooling tubes the heat is drawn therefrom and by making the fins 39 a part of a dummy tube a greater radiating surface for the air to circulate therearound is obtained. This materially adds to the efficiency of the device.

The construction above described has many advantages. It embodies, in effect top and bottom water reservoirs, and an intervening tubular construction composed of separable units or sections, any one of which can be removed without disturbing the others. And each unit or section has at its opposite ends devices for holding open the check valves which, when open, permit the water to circulate through the section. But when the unit is removed the valves close, and remain closed until a new section is inserted. By loosening the clamps 25 it is obvious that each unit or section B′ can be pulled out rearwardly and removed from the radiator, the valves 9 then closing automatically. When the section is put back the fingers 26 press the valves open, permitting water to circulate through the section. In case of accident the damaged unit can be taken out and the vehicle can proceed without leakage of the water.

I claim.

1. A radiator comprising headers provided with normally-closed valves, an intermediate tubular section attachable at its ends to said headers, and means carried by said intermediate section and adapted to automatically open said valves upon the insertion of said section.

2. A radiator comprising upper and lower headers having inwardly-opening normally-closed valves in the walls thereof, connecting tubular sections individually attachable to said headers, and means carried by said sections and adapted to automatically open said valves upon attaching of said sections.

3. A radiator comprising top and bottom headers and a plurality of individually removable tubular sections communicating at their ends with said headers respectively and means actuated by removal of any unit to close the openings in the headers which communicate therewith.

4. A radiator comprising top and bottom headers and a plurality of individually removable tubular sections communicating at their ends with said headers respectively and means actuated by removal of any section to close the openings in the headers which communicate therewith, said means consisting of inwardly opening check valves located in the walls of the header, each section being provided with a projection to open said valve when the section is attached and to permit the same to close when the section is detached.

5. A radiator comprising upper and lower headers having valved openings therein, and a plurality of individually removable tubular sections between the headers, each section having extensions communicating with said openings, and clamps between the headers and the extensions, to hold the sections in place, each extension being provided with means to automatically open the valves when the section is set in place.

6. A radiator comprising top and bottom headers, a removable radiating section communicating with each header through openings therein, and means to automatically close the openings in the headers upon the removal of said section.

7. A radiator comprising upper and lower headers provided with valves, an intermediate tubular section attachable at its ends to said headers, and means for automatically opening said valves by the attaching of said section and means for automatically closing said valves upon the removal of said section.

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

MATHIAS GAL.

Witnesses:

JOHN A. BOMMHARDT,

ROBERT L. BRUCK.