W. A. FINLAYSON.

RADIATOR.

APPLICATION FILED OCT. 2, 1919.

1,386,461.

Patented Aug. 2, 1921.

2 SHEETS—SHEET 1.

Fig. 1.

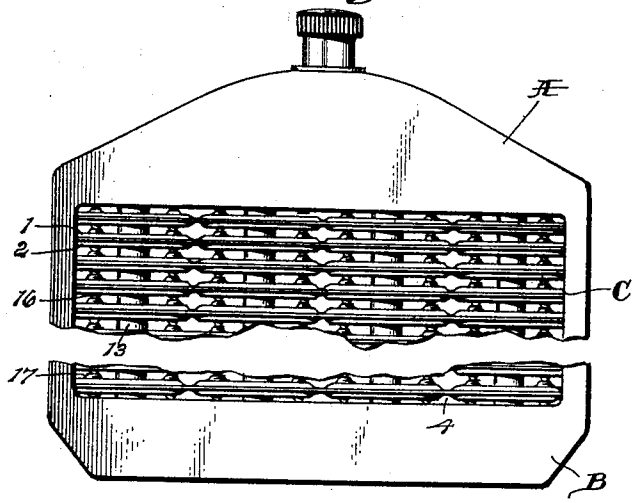


Fig. 2.

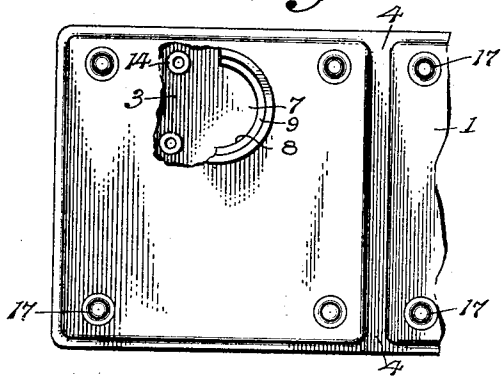
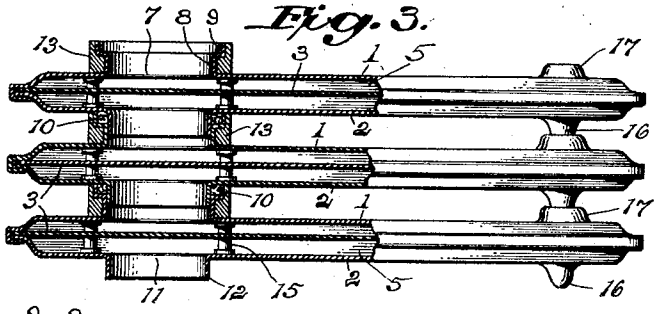


Fig. 3.



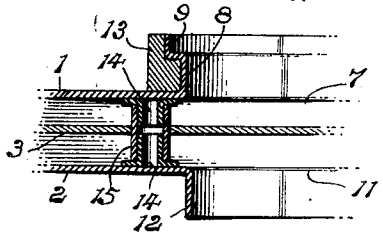


Fig. 4.

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2 SHEETS—SHEET 2.

Fig. 5.

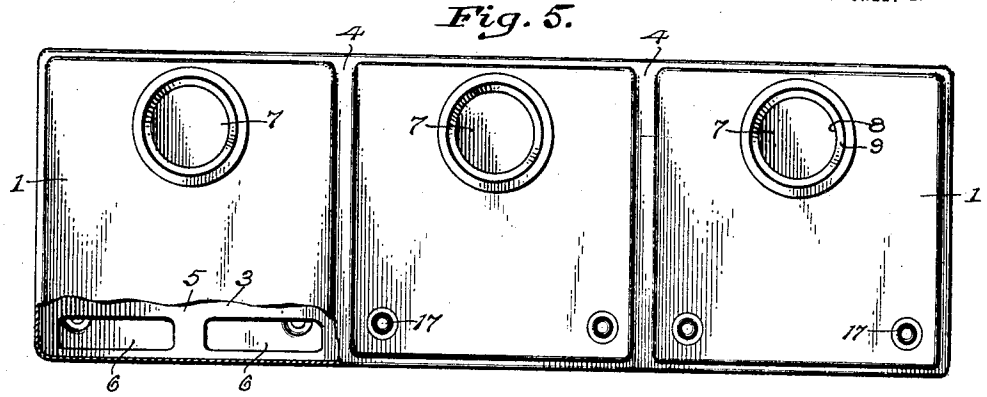


Fig. 6.

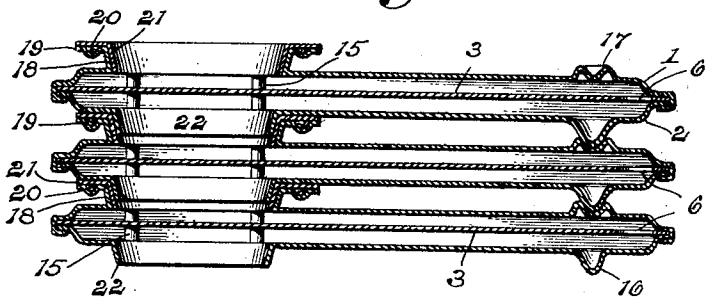
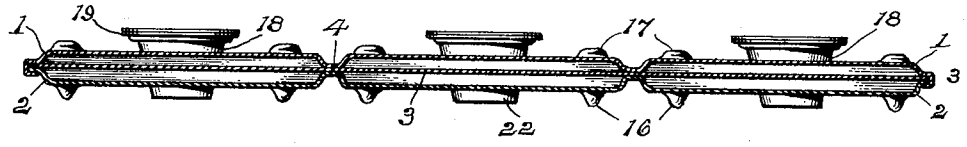


Fig. 7.



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RADIATOR.

1,386,461. Specification of Letters Patent. Patented Aug. 2, 1921.

Application filed October 2, 1919. Serial No. 327,953.

To all whom it may concern:

Be it known that I, WILLIAM A. FINLAYSON, 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.

This invention relates particularly to devices for cooling the circulating fluid for internal combustion engines and its object is to provide a very efficient core for radiators of motor vehicles, it also being an object of the invention to so construct such a core as to make the same very rigid so that it will not be subject to injury in use upon motor trucks and other heavy vehicles where such a device is subjected to heavy strains and stresses in use. A further object of the invention is to provide a construction wherein a circulating fluid is caused to travel in a circuitous path and in contact with thin walls whereby it is efficiently cooled. It is also an object of the invention to construct a radiator core of a series of units which are so made and secured together that they may be quickly detached and removed for the purposes of replacement or repairs. A further object of the invention is to provide a construction of core units which insures against leakage between the units and an easy detachment thereof, and to provide certain other new and useful features in the construction and arrangement of parts, all as hereinafter more fully described.

With the above and other ends in view the invention consists in the matters hereinafter set forth and more particularly pointed out in the appended claims, reference being had to the accompanying drawings in which—

Figure 1 is a front elevation of a radiator with a middle portion thereof broken away to shorten the figure;

Fig. 2 is a plan view of a core element embodying the invention, with portions broken away to more clearly show the construction;

Fig. 3 is a transverse sectional view of a series of core elements in operative relation and showing the same partly in end elevation;

Fig. 4 is an enlarged sectional detail of a portion of a core element;

Fig. 5 is a plan view of a complete core element with portions broken away to more clearly show the construction;

Fig. 6 is a transverse sectional view similar to Fig. 3 and showing slight modifications in the construction, and

Fig. 7 is a longitudinal vertical section through Fig. 5.

As shown in Fig. 1 of the drawings, the radiator comprises the usual top tank A and the bottom tank B which are connected by a core C made up of a series of elements formed of sheet metal and comprising a top wall 1 and a bottom wall 2, each of said walls being formed from a strip of sheet metal of a length to extend across the radiator from side to side thereof and of a width equal to the depth of the radiator. These walls 1 and 2 are spaced apart to form water chambers between them and this space is divided by a baffle wall 3 which extends the full length of the core and is secured at its edges between the edges of the walls 1 and 2 by bending or folding the edge portion of the wall 1 over and beneath the edges of the lower wall 2 and the dividing or baffle wall 3. In order to divide the water chamber into a series of chambers, the metal walls 1 and 2 are compressed at intervals as shown at 4 so that at these points the walls 1 and 2 will come in contact with the baffle plate 3 thus dividing the water space into a series of chambers 5 extending across the radiator. To allow communication between the top of each chamber 5 and the bottom thereof, openings 6 are provided in the baffle plate 3 adjacent the forward edge of the radiator unit and to provide communication between chambers of different units, the upper wall 1 of each unit is provided with an opening 7 in the rear portion of each chamber 5, having an upwardly extending flange 8 surrounding the opening and formed integral with the wall 1. As shown in Figs. 3 and 4, this flange 8 is shouldered near its upper end to provide an annular channel 9 adapted to receive a suitable packing ring 10, and the lower wall 2 is formed with an opening 11 near the rear edge of each chamber 5, which openings are each surrounded by a downwardly extend-

ing annular flange 12 which, when the units are assembled in superposed relation, are adapted to engage within the flange 8 of each of the several openings 7 in the top of the adjacent element below. The packing 10 which is seated in the annular groove 9 of each flange thus forms a tight joint between the several interlocked flanges and effectually prevents leakage. The several flanges 8 may be slightly flared upwardly if found desirable and the interlocking flanges 12 are similarly tapered if desired to fit closely therein when the several units are assembled by pressing them toward each other to force the downwardly extending flanges on one member into the upstanding flanges of the member below. To reinforce the flanges 8 so that they will not bend or buckle under the pressure of assembling the several units, each flange is surrounded by a reinforcing ring 13 which is grooved at its inner side near its upper end to receive the channeled upper end of the flange 8. To prevent the collapse of the walls 1 and 2 under the pressure of assembling the units, spacing members are provided between said walls adjacent each of the openings 7 and 11 of the several units. These reinforcing members comprise tubular rivets 14 which are brazed or otherwise secured to the walls 1 and 2 to extend inwardly toward the baffle wall 3 which is provided with an opening to receive a sleeve 15 which is slipped over the tubular rivets and is of a length to engage the heads of the rivets and space said walls apart. These spacing members thus take the pressure endwise in forcing the units together and as they are arranged substantially in alinement with the collars 13, a very rigid non-collapsible structure is provided to space the several core units, one from another. The lower wall 2 of each unit is formed with a plurality of protuberances 16 and the upper wall 1 is formed with a plurality of protuberances 17 each having a depression to receive the points of the protuberances 16 of the unit above. These protuberances are formed by pressing the sheet metal outwardly in the operation of forming the walls of the unit from the blank strips of sheet metal. The spacing protuberances or members 16 and 17 may be located wherever desired but as shown, they are preferably positioned adjacent the corners of the several water chambers 5.

In the assembling of the several core units, the several interlocking flanges 7 and 11 are arranged in vertical alinement with the upwardly extending flange of the upper unit engaged within openings in the bottom wall of the upper tank A and the lower downwardly extending flanges of the lower element engaged in openings in the bottom tank. Each vertical row of water chambers 5 is thus provided with a vertical water passage formed by the several interlocking flanges, extending from the top tank to the bottom tank and thus the water entering the top tank from the engine jacket is free to flow downwardly through these passages but is deflected within each core unit by the baffle wall 3 which extends across the vertical passage and divides each chamber 5 into an upper and lower compartment. The water entering the upper compartment from the passage spreads out therein and flowing forwardly drops through the opening 6 at the forward edge of the baffle into the lower compartment of the chamber and then through the passage into the next unit below. The water from the upper tank is thus divided and passes downwardly into the several vertical superposed chambers 5 of the several units in which units it is caused to flow forwardly therein, thus flowing in tortuous streams through the radiator core and being spread out in thin layers within each chamber so that by the time it reaches the lower tank its heat has been effectually dissipated.

The construction shown in Figs. 5 to 7 inclusive is the same as that shown in Figs. 1 to 4 inclusive except that the upwardly extending flanges 18 surrounding the openings in the top walls 1 of the several units, are formed with outstanding or lateral flanges 19 at their upper ends which flanges are formed with annular grooves 20 to receive packing rings, and these flanges are stiffened or reinforced by reinforcing thimbles 21 of sheet metal which are interposed between the downwardly extending flanges 22 of the lower wall and said flanges 18.

As above stated, the walls 1 and 2 of each unit are formed from sheet metal strips which are stamped into shape and extend the full length of the core, and the baffles 3 also extend the full length of the core between these walls, thus forming a series of horizontally disposed water chambers 5 in each unit. The baffle plates 3 are inclosed within each unit and as the walls 1 and 2 are connected by a folded seam along their entire marginal edges, leakage is effectually prevented. Leakage between the several units is also effectually prevented by the manner in which the flanges surrounding the several connecting openings are interlocked with suitable packings interposed. The arrangement of units provides a very efficient water cooling core and this core, because of its construction, is very rigid and will not be easily broken or distorted in use or caused to leak by reason of the vibration and heavy shocks and jars to which it is subjected in use upon trucks and other heavy motor vehicles.

Obviously changes may be made within

the scope of the appended claims, in the construction and arrangement of parts without departing from the spirit of my invention and I do not therefore limit myself to the particular construction shown.

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

1. A radiator core comprising a series of superposed horizontally disposed units each formed of thin sheet metal and comprising a top wall, a bottom wall, and an intermediate baffle wall, said top and bottom walls and intermediate wall being interlocked at their side and end edges to form a water tight joint and said top and bottom walls being formed with opposed inwardly extending transverse ribs formed by depressing said walls, said ribs engaging the upper and lower sides of the baffle wall and dividing the space inclosed by said top and bottom walls into a series of separate horizontally disposed chambers, said top wall being also formed with an inlet opening for each chamber of said series and the bottom wall being formed with an outlet for each chamber of said series, the several outlets from the several chambers of each unit being connected with the inlets of the several chambers of the unit below, and said baffle wall being formed with an opening within each chamber to provide communication between the upper part of the chamber above the baffle wall and the lower part of the chamber below the baffle wall, said inlet and outlet openings being arranged in staggered relation to said openings in the baffle wall, whereby the fluid to be cooled in passing through the core is caused to travel downwardly through the several vertical rows of superposed chambers and to travel in a circuitous path through each chamber.

2. In a device of the character described, the combination with a top tank and a bottom tank, of a core comprising a series of superposed horizontally disposed sheet metal units, each unit providing a series of separate horizontally arranged water chambers with the water chambers of each unit arranged in the vertical planes of the water chambers of all the other units and the top unit being provided with an inlet for each chamber communicating with the top tank and the lower unit being provided with an outlet for each chamber communicating with the bottom tank, said intermediate units being spaced apart and the top wall of each intermediate unit being formed with a flanged inlet opening for each chamber adjacent the rear edge of said unit and the bottom wall of each intermediate unit being formed with a flanged outlet opening for each chamber, said flanged outlet openings of each unit being engaged with the flanged inlet openings of adjacent units to form water connections between the several chambers of each vertical row of chambers in the several units, and a baffle wall in each unit extending from end to end and side to side thereof and dividing the several chambers of each unit into an upper and lower part, said baffle wall in each unit being formed with an opening within each chamber adjacent the forward side of the unit, whereby the water in the top tank is caused to flow therefrom through the several outlets into the several vertical rows of chambers in the several units and is caused to flow forwardly within each chamber and pass through the opening in the baffle wall, and then flow rearwardly in the chamber to the outlet from the chamber.

3. A radiator core comprising a series of superposed horizontally disposed units, each having a plurality of spaced horizontally alined water chambers provided with inlet and outlet openings, a downwardly extending flange surrounding each outlet opening, an upstanding flange surrounding each inlet opening, the downwardly extending flanges of one unit being adapted to be engaged within the upstanding flanges of a unit below and detachably interlock the units, a reinforcing collar for each upstanding flange, and spacing members extending across each chamber adjacent said inlet and outlet openings to space the walls of the chambers apart.

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

WILLIAM A. FINLAYSON.

Witnesses:
LEWIS E. FLANDERS,
ANNA M. DORR.