G. ROSSI.

RADIATOR.

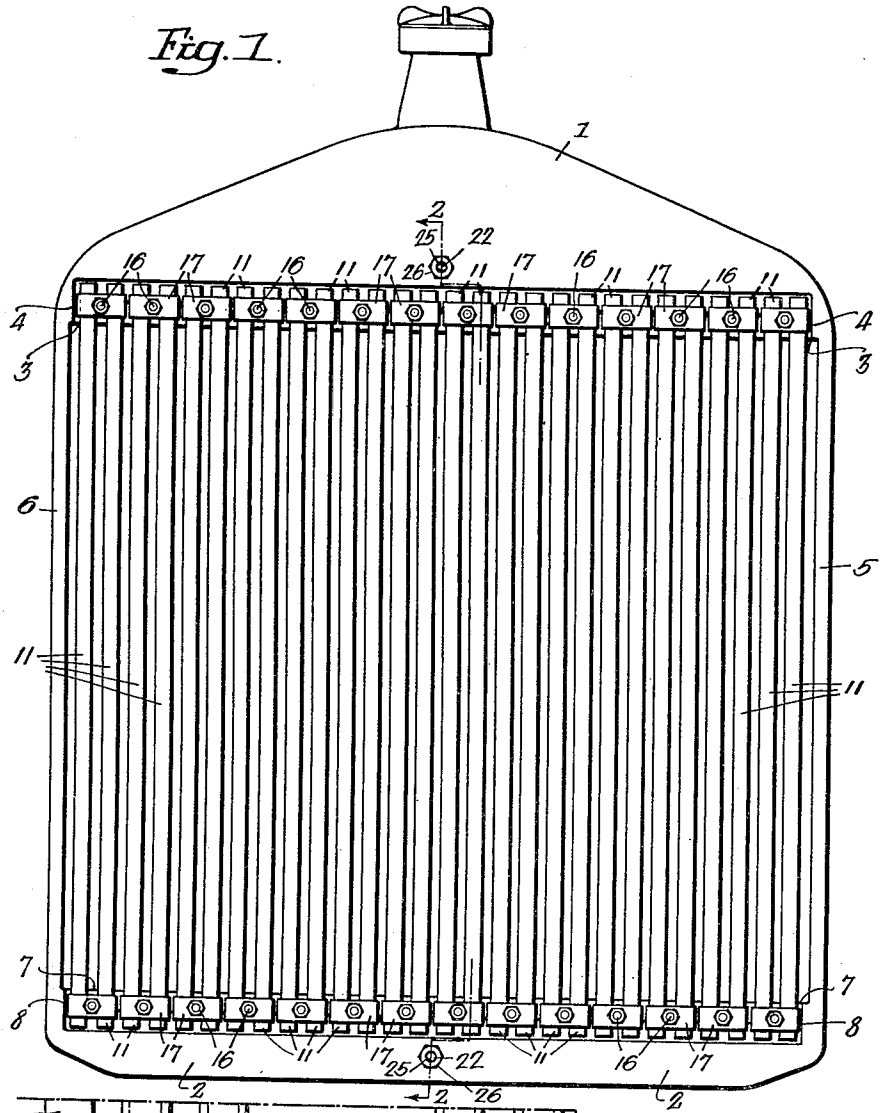
APPLICATION FILED SEPT. 9, 1919.

1,354,341.

Patented Sept. 28, 1920.

3 SHEETS—SHEET 1.

Fig. 1.



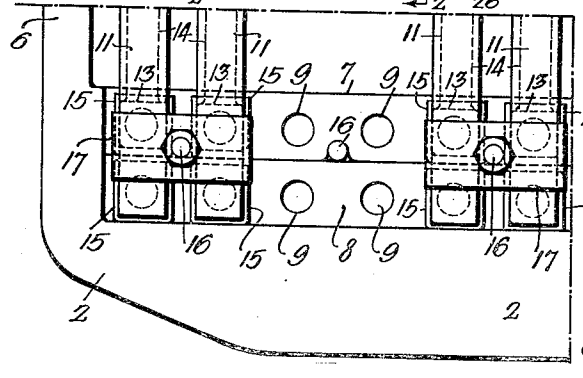


Fig. 3.

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3 SHEETS—SHEET 2.

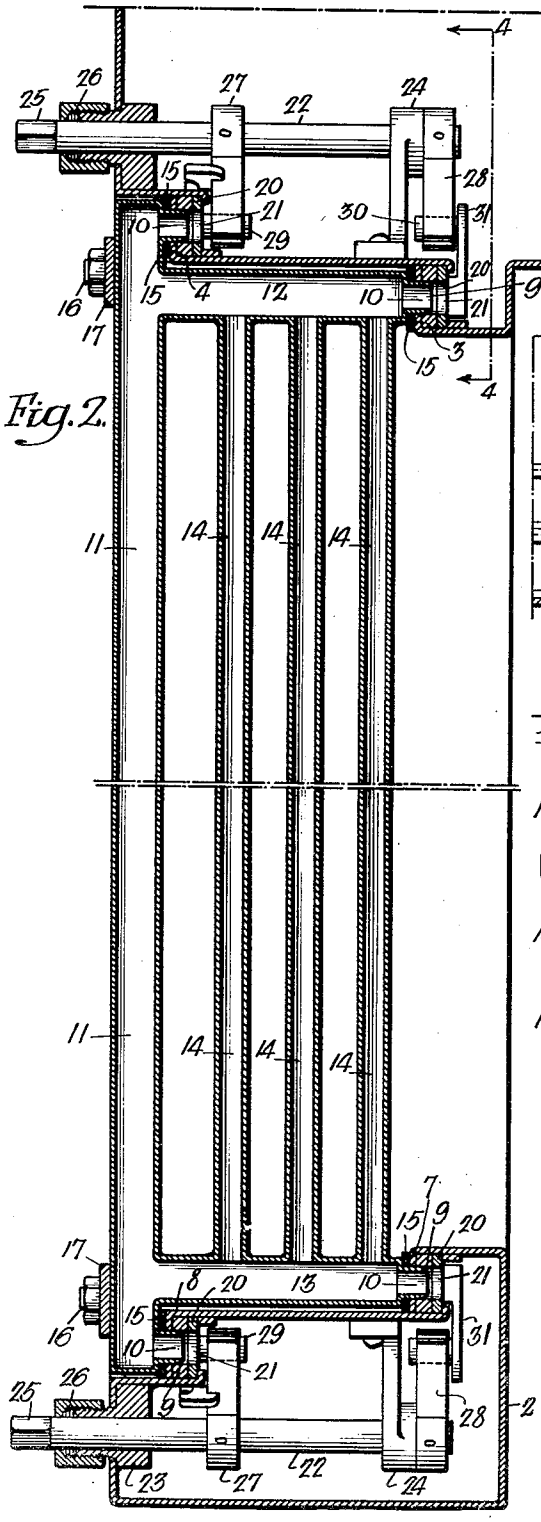


Fig. 2.

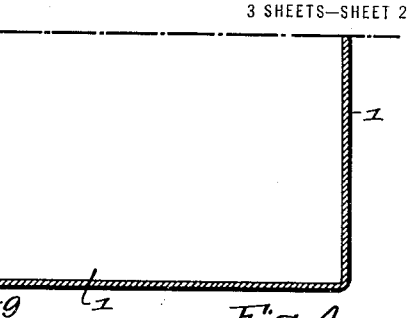


Fig. 4.

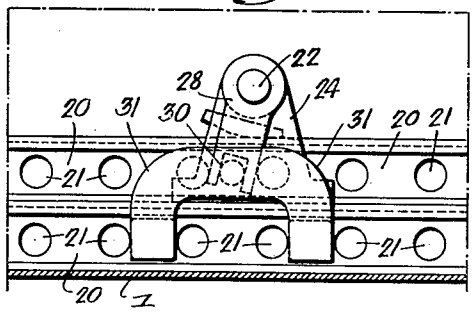
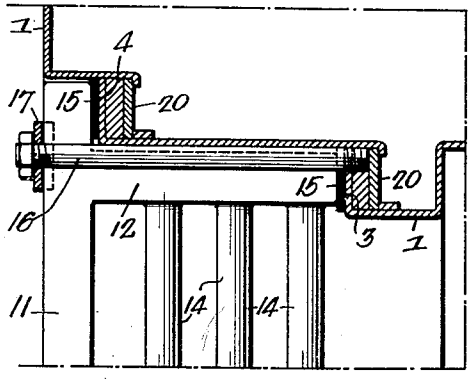


Fig. 5.



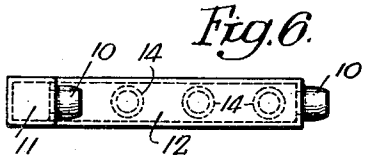


Fig. 6.

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APPLICATION FILED SEPT. 9, 1919.

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3 SHEETS—SHEET 3.

Fig. 8.

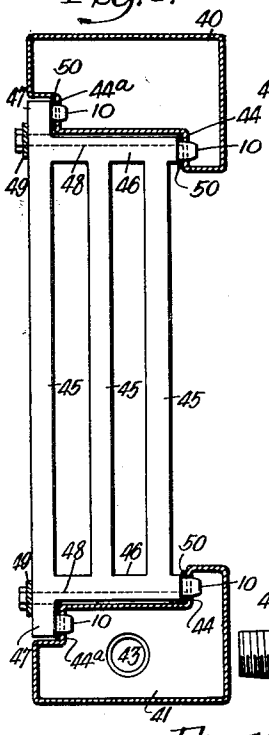


Fig. 7.

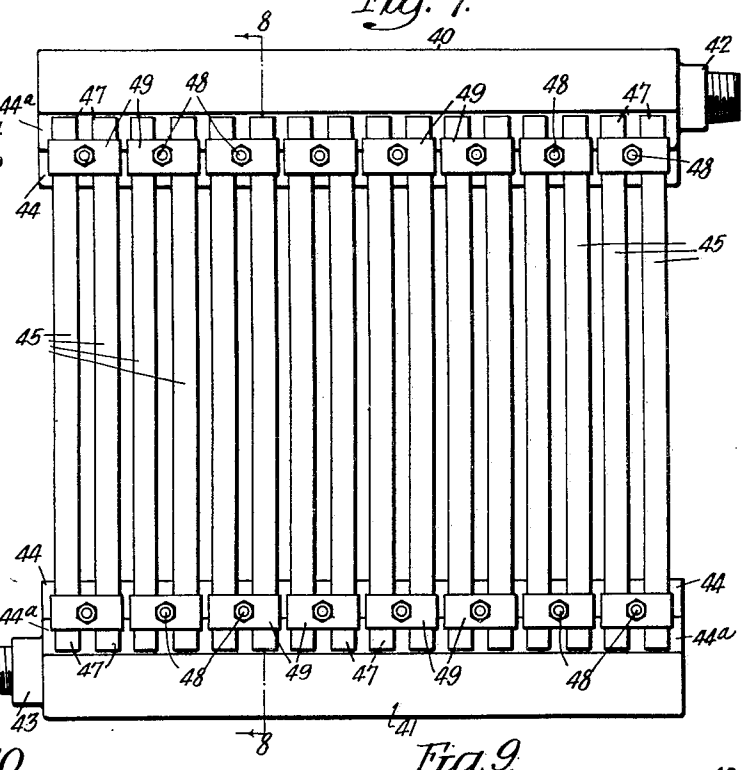


Fig. 10.

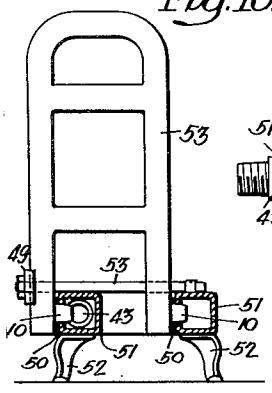


Fig. 9.

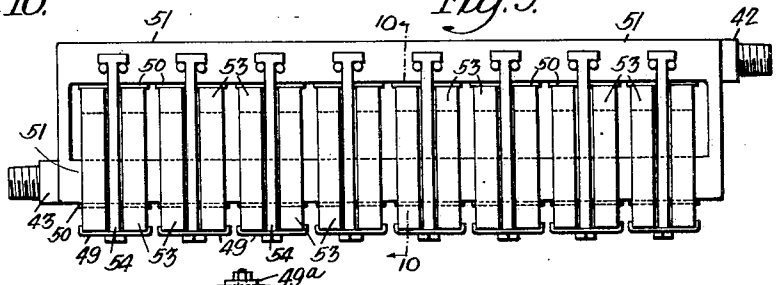
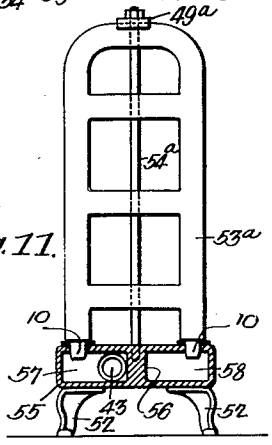


Fig. 11.



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UNITED STATES PATENT OFFICE.

GIACINTO ROSSI, OF PHILADELPHIA, PENNSYLVANIA.

RADIATOR.

1,354,341. Specification of Letters Patent. Patented Sept. 28, 1920.

Application filed September 9, 1919. Serial No. 322,618.

To all whom it may concern:

Be it known that I, GIACINTO ROSSI, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented Radiators, of which the following is a specification.

This invention has to do with a novel form of sectional radiator, particularly adapted for use either as a liquid cooling device or as an air heating means, one object of the invention being to provide a device of this character which may be easily and quickly repaired in case of damage to any of its parts and which may be readily assembled or taken apart.

Another object of the invention is to provide a radiator of novel form, particularly adapted for use as part of the water cooling system of an internal combustion engine,—the construction being relatively simple, substantial and of such a nature as to allow of the removal, repair or insertion of any of its parts or sections with the utmost speed and convenience.

A further object of the invention is to provide a radiator for internal combustion engines which shall include a number of removable, structurally independent sections, together with novel means whereby the escape of liquid from the body or main portion of the radiator may be prevented when any of said sections is to be removed.

I also desire to provide a novel form of removable section for use in radiators for cooling the liquid employed to reduce the temperature of internal combustion engines, whose design and construction shall be simple, substantial and of such a nature that it may be readily inserted in or removed from the body or main portions of a radiator.

These objects and other advantageous ends I attain as hereinafter set forth, reference being had to the accompanying drawings, in which,

Figure 1 is a front elevation of an engine radiator constructed in accordance with my invention;

Fig. 2 is a vertical section, on a scale larger than Fig. 1, taken on the line 2—2, of said figure;

Fig. 3 is a front elevation of a portion of the radiator structure shown in Fig. 2, with one pair of the sections removed;

Fig. 4 is an elevation, partly in vertical section and taken on the line 4—4, Fig. 2;

Fig. 5 is a vertical section taken through one of the section-retaining bolts;

Fig. 6 is a plan view of one of the radiator sections;

Fig. 7 is a side elevation of a radiator constructed in accordance with my invention and particularly adapted for use in a heating system;

Fig. 8 is a transverse vertical section taken on the line 8—8, Fig. 7;

Fig. 9 is a plan of another modification of my invention, also adapted for use in a heating system;

Fig. 10 is a vertical section on the line 10—10, Fig. 9; and

Fig. 11 is another modification.

In Figs. 1 to 6 inclusive of the above drawings, 1 and 2 represent respectively the upper and lower liquid-containing or reservoir portions of a radiator such as is customarily used on motor vehicles for cooling the water or other liquid employed in the engine cooling system, and in accordance with my invention the otherwise flat under side of the upper portion 1 is given a stepped or offset form so as to provide two flat horizontally elongated and vertically narrow clamping faces or shoulders 3 and 4, of which the former is adjacent the front face of the portion 1 and the latter in the present instance, is about half way toward the rear face thereof, although it is to be understood that the relative positions of these faces may be varied as required without departing from my invention.

Similarly the lower portion 2 of the radiator which is rigidly connected to the upper portion by narrow, vertically extending side members 5 and 6, is likewise formed with flat vertical clamping faces 7 and 8 also in stepped relation and respectively placed at the same distances from the front face of the portion 2 as are the flat faces 3 and 4 of the portion 1.

The particular construction of these parts of the radiator body constituted by the portions 1 and 2 is immaterial, as long as they are provided with flat faces in which may be formed a series of more or less closely spaced openings 9 for the reception of nipples 10 or equivalent connecting parts of the removable radiator sections.

In the preferred form of my invention each of said sections consists of an elongated tube 11, in the present instance of rectangular section, closed at its ends and having adjacent the same relatively short laterally projecting nipples 10, preferably slightly tapered so that they may be fitted or forced into the openings 9 formed in the clamping faces 4 and 8 of the body portions of the radiator.

In addition to these nipples each of the main or front tubes 11 of each radiator section has projecting from it two parallel tubular members 12 and 13 which at their distant ends are likewise provided with nipples 10 designed to fit into openings 9 formed in clamping faces 3 and 7 of the radiator body portions 1 and 2. The branches 12 and 13 are connected by one or any desired number of tubular members 14 parallel with and in the same plane as the front member 11 and in order to prevent the possibility of leakage between the nipples of the radiator section and the body portions of the radiator, suitable packing or other means is provided, in the present instance, washers or gaskets 15, which fit around the nipples 10 and are confined between the flat faces of the body portions and the adjacent surfaces of the radiator section.

While the tubular members 11 and 14 of the radiator sections may have any desired cross section, I preferably make the members 11 rectangular in section and the auxiliary members 14 circular in section and of less diameter than said main members, so spacing the sets of holes 9 that the sections extend vertically and are separated by a distance which may be something less than their width, as shown in Fig. 3.

For removably maintaining the various sections in place I mount between each pair of them, bolts 16 preferably threaded into suitable holes in the flat faces 3 and 7. Each of these bolts engages a clamping plate 17 which extends over the two adjacent radiator sections and is held in place by a nut threaded on said bolt. In case of leakage between any of the radiator sections and the body portions 1 and 2 or in the event of damage to any of said sections, one or more of them may be quickly and conveniently removed merely by taking off the nuts of the two bolts 16 adjacent their extremities, after which the latter may be drawn outwardly away from the body portion of the radiator.

In replacing any section, its four nipples 10 after having had applied to them suitable gaskets or packing rings, are simultaneously introduced into the proper openings in the faces 3, 4, 7 and 8 and the appropriate clamping plates 17 are then put in place on the bolts 16 for the particular section or pair of sections operated on. The nuts of these bolts are then set up so that the various nipples are tightly forced into their openings and liquid proof joints are formed by the action of the packing rings on the surfaces of the sections and radiator body adjacent thereto.

If it be desired to prevent the escape of water from the body portions 1 and 2 when one or more radiator sections are being removed and replaced, I may provide a valve mechanism such as illustrated in Figs. 2 and 4. For this purpose I provide elongated valve plates 20, slidably guided to the rear of and immediately adjacent each of the lines of holes 9 of the four clamping faces 3, 4, 7 and 8, and form in these plates holes 21 so spaced as to normally register with said holes.

When it is desired to prevent the escape or passage of water through the holes 9, the adjacent plate 20 is moved longitudinally in its guideways sufficiently to cause its unperforated portions to be brought over said holes and for this purpose any suitable actuating mechanism may be provided. In the present instance I have employed oscillatory spindles 22 respectively mounted in bearings 23 and 24 within the body portions 1 and 2 of the radiator so that one end of each spindle, properly squared or otherwise formed for the reception of a wrench, projects beyond the front face of the radiator as shown in Fig. 1. A stuffing box 26 is preferably provided where each spindle passes through the front walls of the radiator and each spindle has fixed to it a pair of forked arms 27 and 28 of which the first engages a pin 29 projecting rearwardly from the plate valve 20 adjacent the clamping faces 4 or 8, and the second similarly engages a pin 30 projecting from a yoke 31 whose arms are rigidly connected to the valve plate 20 operative adjacent the clamping faces 3 or 7. With this arrangement a slight turning of either spindle 22 in one direction will move the plate valves 20 associated therewith so as to cut off or permit flow of liquid between the entire series of radiator sections and the body portions 1 or 2 of the radiator.

In a radiator of the construction noted the air is free to flow between and around the tubular members 11 and 14 of the various radiator sections so as to effectually cool the liquid flowing through them. It is obvious that the number of members 14 in each of the radiator sections may be varied as may also their dimensions, to suit any required conditions.

It will be understood that my invention is applicable for use in heating systems employing either steam or hot water, and in Figs. 7 and 8 I have illustrated a house radiator in which my improvements are embodied, which consists of upper and lower manifolds 40 and 41 of which the first has an outlet 42 and the second has an inlet 43.

Each of these manifolds is provided with parallel clamping faces 44 and 44ª having lines of openings designed to receive tapered or other suitably formed nipples 10 projecting from the radiator sections.

Each of these sections consists of a casting formed of parallel tubular members 45 connected at their ends by transverse tubular members 46, each having one of the nipples 10 at its outer end. The front portion of the casting is extended in opposite directions as indicated at 47 for the reception of a second pair of nipples 10 designed to enter the openings of the clamping face 44ª. As in the other form of my invention, the radiator sections are clamped in pairs to the manifolds 41 and 42 by suitable bolts 48, having nuts which engage clamping plates 49 extending over the two radiator sections on either side of them. While packing rings 50 are preferably employed to prevent leakage between the radiator sections and the manifolds, they may be omitted if push nipples are employed.

In another form of my invention I provide a casting having two independent but rigidly connected manifold sections 51 which may be mounted on supporting legs 52 and provided with two lines of openings in one face. In this case the radiator sections 53 are of an elongated U-shape with nipples 10 adjacent the ends of their arms so placed that one of them projects from the outer side of one arm and the other projects from the inside of the second arm toward the first arm. The radiator sections as before are held to the manifold in pairs, in this case by bolts 54 whose heads engage one of the manifolds 51 and whose opposite ends extend through clamping plates 49 each of which engages one branch of each section so as to force this as well as the second branch thereof toward the manifolds.

In that form of the invention shown in Fig. 11 I provide a single hollow casting 55 having a central longitudinally extending partition 56 whereby it is divided into two chambers 57 and 58. These latter have lines of openings in their top faces for the reception of nipples 10 which in this case project from the ends of the arms or branches of the elongated U-shaped radiator sections 53ª. Bolts 54ª extending longitudinally between the sections of adjacent pairs are threaded at one end into the casting 55 and at their opposite ends have nuts for engaging the clamping plates 49ª.

In all of the above noted forms of my invention the sections may be quickly and independently removed and replaced as desired, and as indicated, may be made in different forms to give any required radiating surface.

I claim:

1. The combination in a radiator of two body portions having lines of openings; radiator sections removably connecting said body portions and communicating therewith through the openings; with valves for simultaneously closing the openings of the body portions at will.

2. The combination in a radiator of body portions having lines of openings; a plurality of radiator sections connecting said body portions and having openings through which they communicate therewith; and slidable plates respectively mounted adjacent the lines of openings of the body portions and having openings movable into line with those of the latter; with means for adjusting the positions of the plates to close said latter openings.

3. The combination in a radiator of two body portions; a series of radiator sections removably connecting said body portions and each communicating therewith through a plurality of openings; a plurality of valves for each of the body portions for controlling passage of fluid to the sections; and two devices for the body portions respectively, for actuating said valves.

4. The combination in a radiator of two body portions each having a plurality of clamping faces arranged in stepped relation and formed with series of openings; a slidable valve plate mounted adjacent each of said sets of openings for controlling the flow of liquid therethrough; means for operating the valve plates of each body portion; a series of radiator sections removably connecting the body portions and communicating therewith through said holes; and means for normally retaining the radiator sections in place.

5. A radiator section consisting of a main elongated tubular member; two laterally extending tubular members projecting from said main member adjacent the ends thereof; and at least one tubular member connecting said laterally extending members, the main member being projected beyond the laterally extended members and having side openings therein for communication with the body portions of the radiator.

6. A radiator section consisting of an elongated main tubular member; two laterally extending tubular members projecting from said main member adjacent the ends thereof; with at least one tubular member connecting said laterally extending members, the first tubular member being projected beyond the laterally extended members and having side openings therein for communication with the body portions of the radiator, there also being openings in the ends of said laterally extended members for connection to the body portions of a radiator.

7. A radiator section consisting of a main tubular member having laterally extended

portions adjacent its ends; and auxiliary tubular members of less diameter than said first member extending parallel thereto between the laterally extended portions thereof.

8. A radiator section consisting of a main tubular member having laterally extended portions adjacent its ends; and auxiliary tubular members of less diameter than said first member extending parallel thereto between the laterally extended portions thereof; with nipples projecting laterally from the side portions of the main tubular member and also from the ends of the lateral extensions thereof.

9. The combination in a radiator of two body portions each having a plurality of clamping faces arranged in stepped relation and respectively provided with series of holes; a series of radiator sections each having two sets of offset portions formed to coöperate with the stepped clamping faces of the body portions and formed with openings placed to register with those of the body portions; with means for removably retaining the sections in position consisting of bolts operating on the outer portions of the sections and engaging the inner of the stepped clamping faces.

10. The combination in a radiator of two body portions each having a plurality of clamping faces arranged in stepped relation and provided with a series of openings in said faces; a plurality of radiator sections each including an elongated tubular member and two laterally extending tubular members projecting therefrom adjacent its ends; nipples for each of said sections projecting adjacent each end of said first tubular member and at the outer end of each laterally extending member in positions to enter the openings of the clamping faces of the body portions; with devices for removably holding said radiator sections to the body portions consisting of bolts projecting between each two sections adjacent the ends thereof and entering the inner of the clamping faces; and clamping plates on the bolts engaging the adjacent radiator sections.

11. The combination in a radiator of two body portions each having an inner and an outer clamping face provided with series of holes; a series of radiator sections each having two sets of off-set portions formed to coöperate with the clamping faces of the body portions and having openings positioned to register with those of said latter portions; with bolts threaded into the inner faces of each of the body portions in position to extend between adjacent pairs of radiator sections; and a clamping plate for each bolt engaging the radiator sections immediately adjacent thereto.

In witness whereof I affix my signature.

GIACINTO ROSSI.