No. 801,397. PATENTED OCT. 10, 1905.

A. D. RAY.

RADIATOR.

APPLICATION FILED APR. 18, 1904.

Fig. 1.

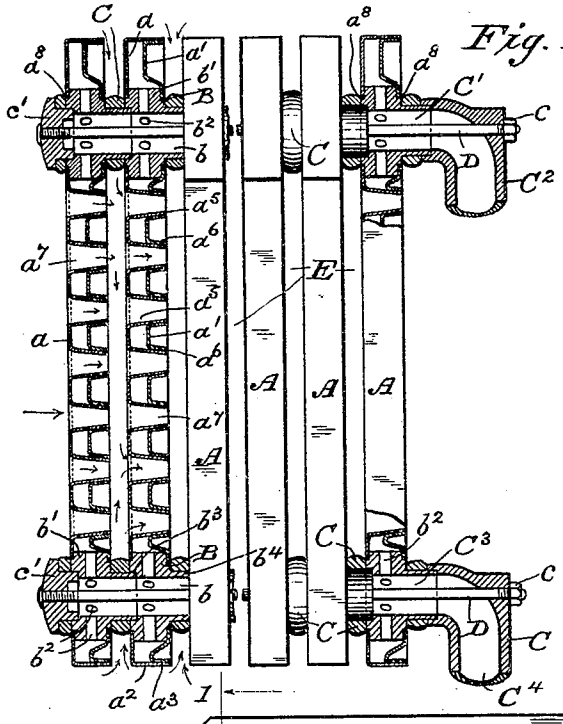


Fig. 3.

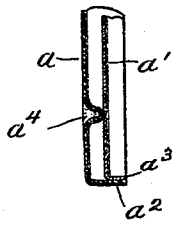


Fig. 2.

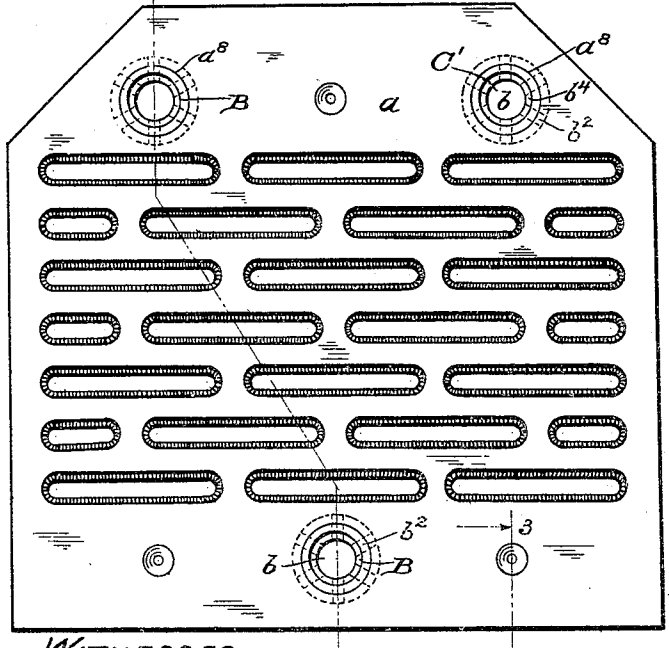
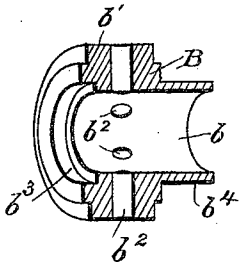


Fig. 4.



WITNESSES:

A. D. Davies

G. W. Saywell

INVENTOR:

Albert D. Ray

by his attorney

J. B. Ray

# UNITED STATES PATENT OFFICE.

ALBERT D. RAY, OF CLEVELAND, OHIO.

## RADIATOR.

No. 801,397. Specification of Letters Patent. Patented Oct. 10, 1905.

Application filed April 18, 1904. Serial No. 203,621.

*To all whom it may concern:*

Be it known that I, ALBERT D. RAY, a citizen of the United States, and a resident of Cleveland, county of Cuyahoga, and State of Ohio, have invented a new and useful Improvement in Radiators, of which the following is a specification, the principle of the invention being herein explained and the best mode in which I have contemplated applying that principle so as to distinguish it from other inventions.

My invention relates to devices for cooling heated water for use in motor-vehicles and commonly referred to as "radiators."

The object of the invention is to provide a radiator economical in its construction and efficient in its operation. The said invention consists of means hereinafter fully described, and particularly set forth in the claims.

The annexed drawings and the following description set forth in detail certain mechanism embodying the invention, such disclosed means constituting but one of various mechanical forms in which the principle of the invention may be used.

In said annexed drawings, Figure 1 represents a broken side elevation, partly in section, of a radiator embodying my invention. Fig. 2 represents a front elevation of one section of the radiator, viewed as indicated by the arrow in Fig. 1. Fig. 3 represents a detail section taken upon the plane indicated by line 3 3, Fig. 2. Fig. 4 represents a perspective section of one of the bushings used in said radiator.

The radiator illustrated and embodying my invention consists of a series of juxtaposed upright sections A A, &c., all substantially duplicate in form and connected, as will hereinafter be described. Each section is hollow and of a form having a suitable height and depth, but having a comparatively small width, as shown. Such section consists of two sheet-metal elements $a$ and $a'$, formed with peripheral flanges $a^2$ and $a^3$, respectively. The inside diameter of the flange $a^2$ of sheet $a$ is made substantially equal to the outer diameter of flange $a^3$ of sheet $a'$, so that the latter sheet may be fitted inside the former, with said flanges extending in the same direction and the two flanges soldered together to form a hollow section. Flange $a^2$ is made longer than flange $a^3$, as shown, and sheet $a$ is provided with struck-up teats $a^4$, which act as separators for the two sheets. Each of the two sheets $a$ and $a'$ is provided with a series of similarly-placed openings surrounded by struck-up flanges $a^5$ and $a^5$, respectively, flanges $a^6$ being shorter than and fitting around flanges $a^5$, the said flanges extending from their respective plates in the same direction. These flanges are soldered together and are of frusto-conical formation, whereby perforations $a^7$ of frusto-conical form are provided in each section, as shown in Fig. 2. The interior of the hollow section hence forms a series of channels presenting a large exterior radiating-surface for contact with air surrounding or passing through the radiator-section. Each section is formed with openings $a^8$, perforating both sides of its shell, at the upper portion thereof, as shown, and in these openings are fastened bushings B, having a central horizontal bore $b$, a main portion $b'$ fitting snugly between the two plates or sheets $a$ and $a'$, provided with a plurality of small openings $b^2$, passing from the bore $b$ and discharging into the interior of the section. Each bushing is furthermore provided with a female formation and a male formation at the opposite ends and comprising a counterbore $b^3$ upon one side and a nipple $b^4$ upon the other, the nipple projecting some distance from the section and fitting snugly in the bores $b^3$, as shown. Intermediately of each two adjacent bushings is placed a pliable gasket C, seated upon the nipples. The end bushings are provided with a cap $c'$ and connected with a common supply-pipe $C^2$, respectively, so that it will be seen the series of bushings form continuous ducts C', communicating with the upper portion of the interior of each section. In a similar manner a discharge-duct $C^3$ is formed communicating with the lower part of each section and is connected with a common discharge-pipe $C^4$. The entire series of sections A are detachably secured to each other by means of rods D passing through the supply and discharge ducts, one end of the said rods being threaded into the caps $c'$, and the opposite end passing through the elbows of the pipes $C^2$ and $C^4$ and secured upon the outside by nuts $c$, as will be readily understood from the drawings, the nipples acting as separators for the sections. The gaskets render the joints water-tight. As illustrated, the juxtaposed sections and the perforations thus alined are placed so as to bring the larger end of one perforation in opposition to the smaller end of a similar perforation in the adjacent section,

so that air passing through the perforations in the direction indicated by the small arrows in Fig. 1 will have an inspirating or injecting effect—that is, the perforations form a plurality of inspirators or injectors the action of which effects a flow of air from all sides of the exterior of the radiator, and thus provide a supply of cool air to the upright free air-spaces E between adjacent sections, such cool air being carried on through the sections.

In the above-described manner I provide a radiator construction which may be economically built, the sections of which may be readily removed and replaced, and which presents a large radiating-surface, and which provides for a maximum contact of cool air to the said radiating-surfaces.

Other modes of applying the principle of my invention may be employed instead of the one explained, change being made as regards the mechanism herein disclosed provided the means stated by any one of the following claims or the equivalent of such stated means be employed.

I therefore particularly point out and distinctly claim as my invention—

1. In a radiator, the combination of two hollow juxtaposed sections provided with alined perforations, the latter having an area on one side of their respective sections greater than that on the other, said sections being placed so as to bring the smaller ends of the perforations in one section opposite the larger ends of the perforations in the adjacent section.

2. A body portion for a radiator-section consisting of two peripherally-flanged sheets of thin metal, flanges of which extend in the same direction and at almost a right angle from each sheet, the one sheet placed within the other and having said flanges secured to each other, each sheet provided with alined flanged openings the flanges of which extend in the same direction and at almost a right angle from their respective sheets, such flanges of one sheet fitting in and secured to the alined flanges of the other sheet.

3. In a radiator, a section consisting of two peripherally-flanged sheets of thin metal, the flanges of which extend in the same direction and at almost right angles from their respective sheets, the one sheet placed within the other and having said flanges secured to each other, each sheet formed with alined flanged openings the flanges of which extend in the same direction from their respective sheets and are of different depth, the flanges of one sheet fitting in and secured to the corresponding flanges of the other sheet to form a watertight joint therewith.

Signed by me this 15th day of April, 1904.

ALBERT D. RAY.

Attest:
G. W. SAYWELL,
A. E. MERKEL.