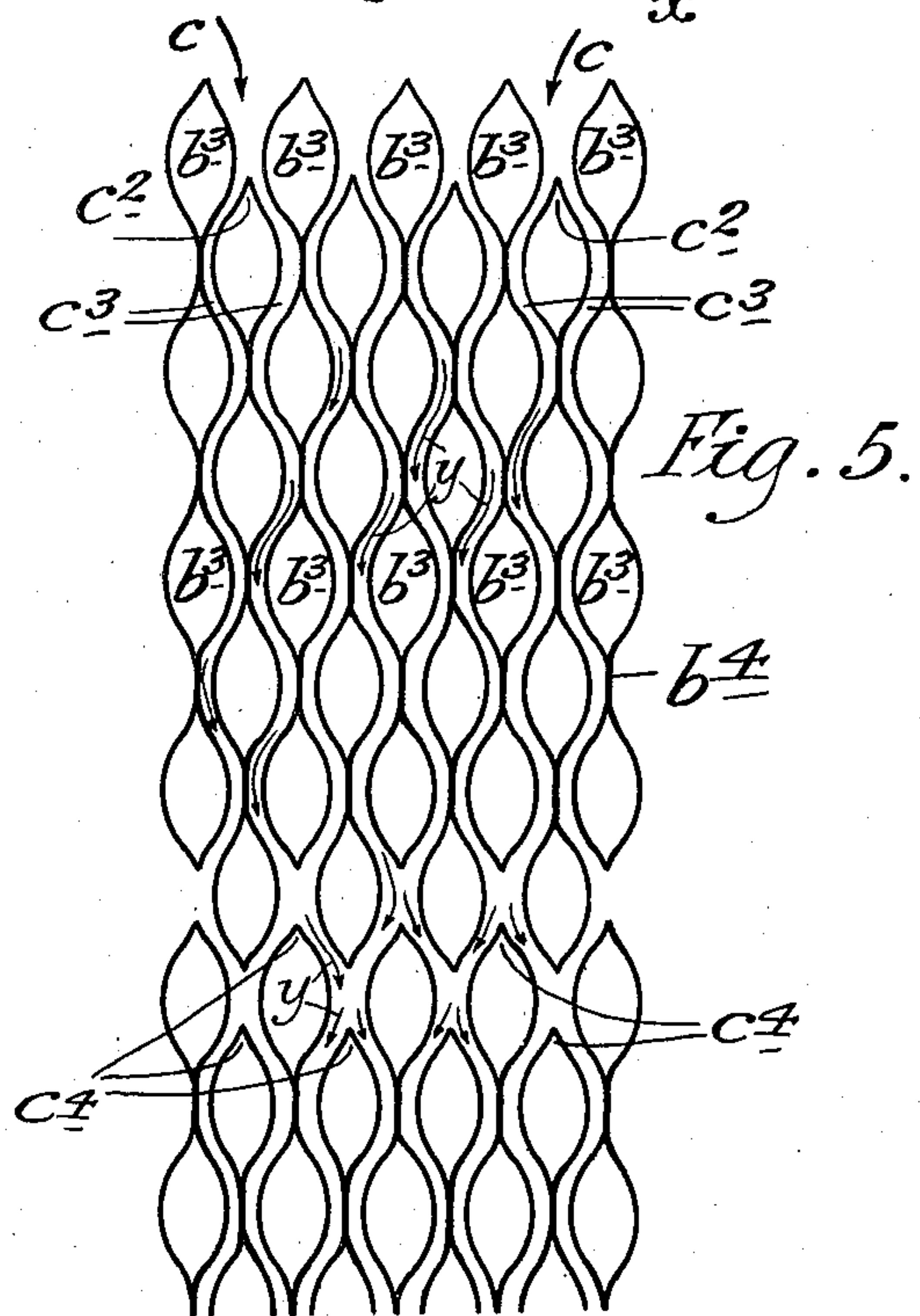
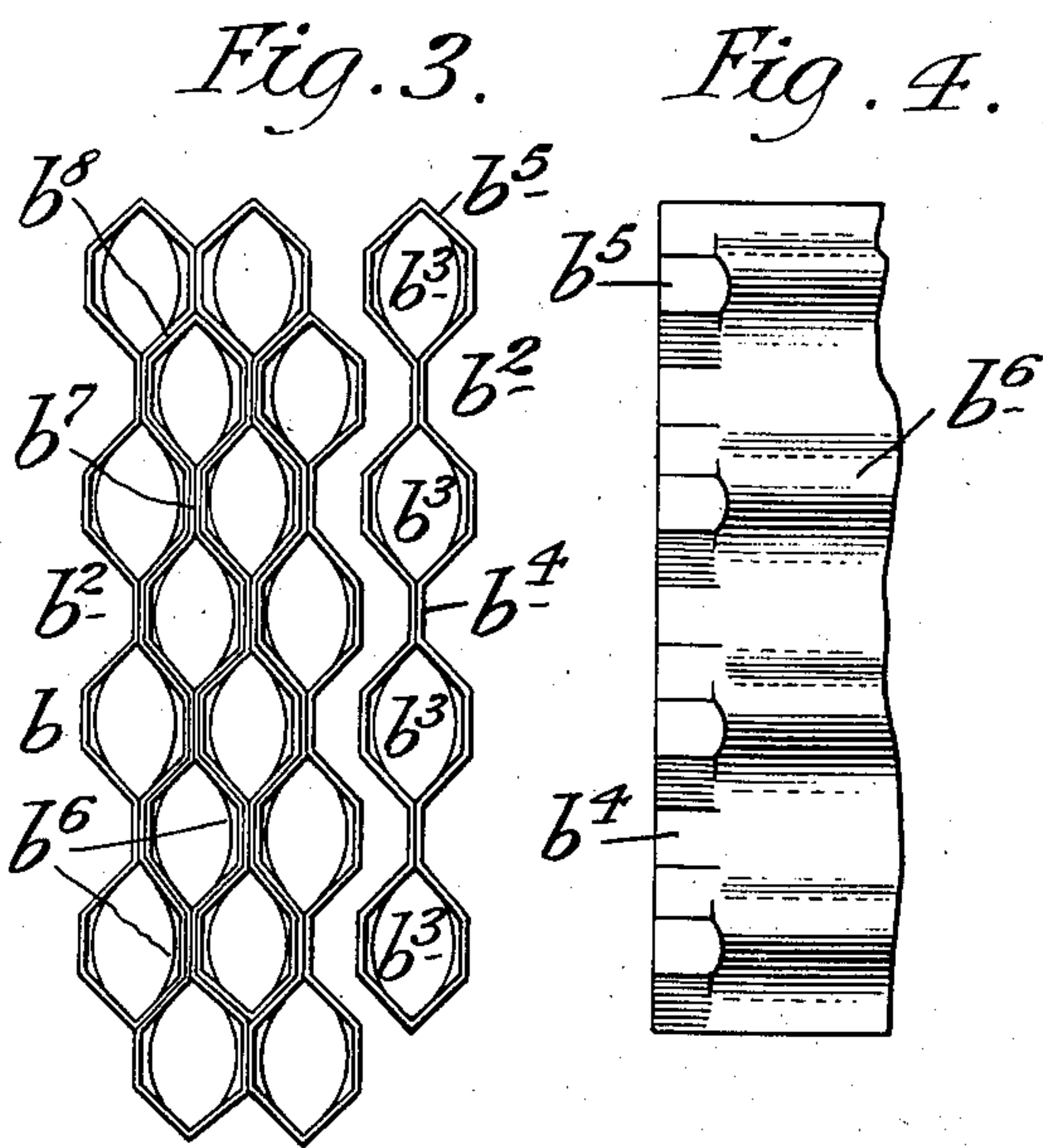
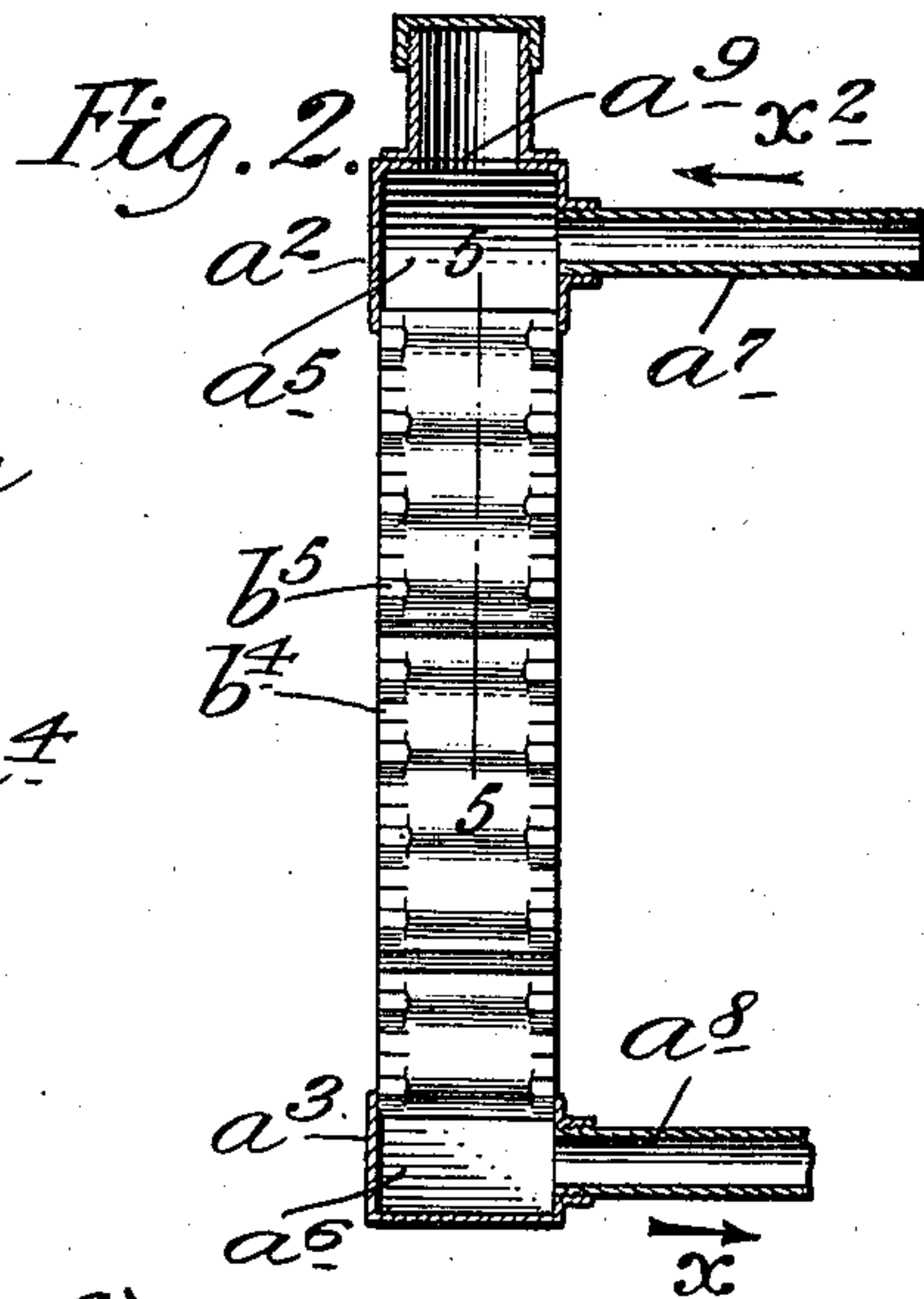
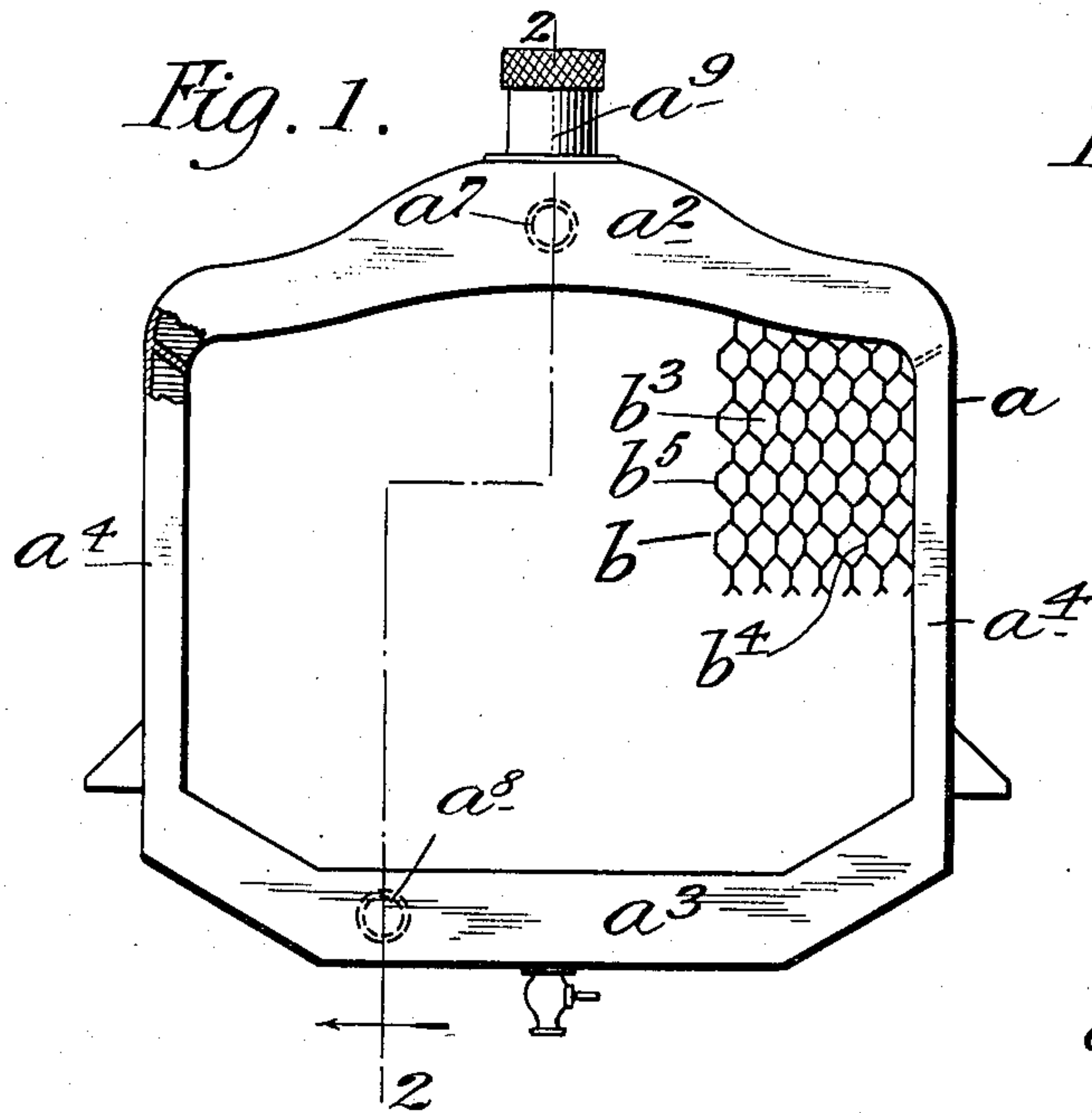


J. FLEISCHMAN.  
 AUTOMOBILE RADIATOR.  
 APPLICATION FILED DEC. 17, 1909.

975,343.

Patented Nov. 8, 1910.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

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## AUTOMOBILE-RADIATOR.

975,343.

Specification of Letters Patent.

Patented Nov. 8, 1910.

Application filed December 17, 1909. Serial No. 533,549.

*To all whom it may concern:*

Be it known that I, JACOB FLEISCHMAN, a citizen of the United States, and residing at Jersey City, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in Automobile-Radiators, of which the following is a specification, such as will enable those skilled in the art to which it appertains to make and use the same.

This invention relates to water coolers for automobiles otherwise known as radiators, and the object thereof is to provide an improved device of this class together with the greatest possible radiating qualities whereby the water used for cooling the engine may be freely circulated and kept at the lowest possible degree of temperature.

The invention is fully disclosed in the following specification of which the accompanying drawing forms a part in which the separate parts of my improvement are designated by suitable reference characters in each of the views, and in which;—

Figure 1 is a partial front end view of a radiator of an automobile made according to my invention with part of the construction broken away; Fig. 2 a section on the line 2—2 of Fig. 1; Fig. 3 an end view of the method of connecting the separate parts or units of which the radiator is composed; Fig. 4 a side view of one of the separate parts or units of the radiator, and;—Fig. 5 an enlarged diagrammatic sectional view of my improved radiator, the line of the section being that indicated at 5—5 in Fig. 2, and showing the passages in the radiator through which the water circulates.

In the drawing forming part of this specification I have shown at  $a$ , the frame of the radiator usually employed by automobiles, and this radiator comprises a top member  $a^2$  and bottom member  $a^3$  connected by side members  $a^4$ . The top member  $a^3$  forms a chamber  $a^5$  and the bottom member  $a^3$  forms a chamber  $a^6$  and communicating with these chambers are pipes  $a^7$  and  $a^8$ , which in practice are connected with the engine in the usual manner and through which the water circulates or passes to and from the engine as indicated by the arrows  $x$  and  $x^2$  in Fig. 1, and the top chamber  $a^5$  of the radiator is provided with the usual filling aperture or opening  $a^9$ , through which the water is passed into the radiator.

The body portion of the radiator is made up of separate units  $b^2$  composed of sheet metal and comprising a plurality of tubular members  $b^3$ , preferably four in number connected by web members  $b^4$ , said tubular members and web members being arranged in the same plane or in a plane passing through the axis of the tubular members. The end portions of the tubular members  $b^3$  are hexagonal in form, as shown at  $b^5$  and the body portions of said tubular members are preferably elliptical in cross section, the transverse dimensions thereof being less than the transverse dimensions of the end portions  $b^5$ , this construction being clearly indicated at  $b^6$  in Figs. 3 and 4.

The separate units  $b^2$  of the radiator are formed from tubes of thin metal such as brass, copper or other suitable metal, or from sheets of metal folded together and the ends thereof soldered, and the web portions  $b^4$  of said units are thus made of two thicknesses.

The separate units  $b^2$  are connected in transverse series to form the body of the radiator as shown in Fig. 3, the alternate units of each series being arranged one step lower than the others, and in practice two or more of these series are placed together one above another, as indicated in Fig. 5, and the end portions  $b^5$  of the separate units of the radiator are connected when placed together in the manner shown and described by soldering in the usual way, and when the said units are connected in this manner and the end portions thereof soldered together there are four thicknesses of metal at  $b^7$  where the end of the tubular members  $b^3$  connect, said four thicknesses being formed by the web portions  $b^4$  of the separate units, and two thicknesses at  $b^8$ ; in other words four of the sides of the tubular member  $b^3$  or the ends  $b^5$  thereof are of two thicknesses, while the other two sides are of four thicknesses and this insures, when the end portions of said separate units  $b^2$  are soldered together, a strong and substantial construction.

It will be understood, that, in practice, the water enters the chamber  $b^5$  at the top of the radiator and passes downwardly through the radiator or between the separate tubular members thereof as indicated by the arrows  $y$  in Fig. 5. In this operation the water passes between the first transverse top row



of the tubular member  $b^3$  of the separate units of the radiator as indicated by the arrows  $c$ , and this water is divided at  $c^2$  by the top edges of the second transverse row of units of the radiator and flows downwardly through two separate passages  $c^3$  and is again divided at  $c^4$  and continues on down to the bottom of the radiator where it enters the chamber  $a^6$ .

From the foregoing description it will be seen that the chief characteristic of my improved radiator is that the body portion thereof through which the water passes downwardly is composed of separate transverse series of units, one of which is placed above another, the separate units being made up of separate tubular members connected by web members, said units being placed together side by side with the alternate units one step lower than the others. The end portions of the tubular members of said units being larger than the body portions thereof whereby passage ways are formed between the separate units in each series, and said end portions being hexagonal in form and soldered together. It will be apparent that a radiator made in this manner may be of any desired dimensions or capacity and any desired number of series of units may be employed, one above another, and any desired number of similar units may be placed in each series.

In practice the air passes from the front of the radiator backwardly therethrough or through the tubular members  $b^3$  of the separate units  $b^2$  and as the water passes downwardly between the separate units of the radiator or the separate units of the separate series of units which constitute the radiator, and is divided up in its passage as herein described, it is quickly and easily cooled, the motion of the automobile facilitating the passage of the air through the radiator as in all other devices of this class.

Having fully described my invention,

what I claim as new, and desire to secure by Letters Patent, is;—

1. A radiator of the class described, composed of a plurality of sheet metal tubular units each having expanded hexagonal ends with an intervening portion of elliptical form, said central portions being separated by a web portion of two thicknesses of the metal, the said ends of the units being nested together and securely united, the said central portions of said members forming undulating or tortuous curved passages from top to bottom, such passages being closed at each side by the united expanded portions of said units, the union at the points at which the web portions are united with adjacent parts consisting of four thicknesses of metal.

2. A radiator of the class described, composed of a plurality of sections of sheet metal tubular units each having expanded hexagonal ends with an intervening or central portion of elliptical form, said central portions of the tubes being separated by a web of two thicknesses of metal, the said ends of the units being nested together and securely united, leaving passages between the central portions, the union at the points at which the web portions are secured to adjacent portions consisting of four thicknesses of metal, the said radiator having one or more sections in vertical alinement, the said passages being merged or connected by a space intervening between the alined sections, the united enlarged hexagonal portions forming the closing of said passages at the sides.

In testimony that I claim the foregoing as my invention I have signed my name in presence of the subscribing witnesses this 16th day of December 1909.

JACOB FLEISCHMAN.

Witnesses:

C. E. MULREANY,  
B. M. RYERSON.