

H. P. SMITH & L. E. HOOKER.

AUTOMOBILE RADIATOR.

APPLICATION FILED AUG. 21, 1908.

Patented Dec. 7, 1909.

2 SHEETS—SHEET 1.

942,677.

Fig. 2.

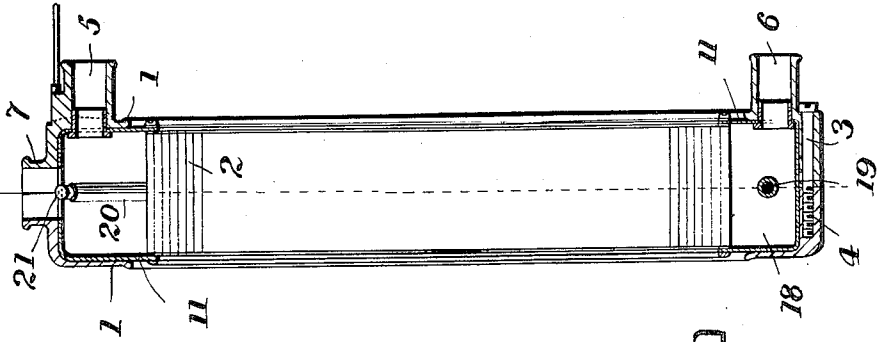
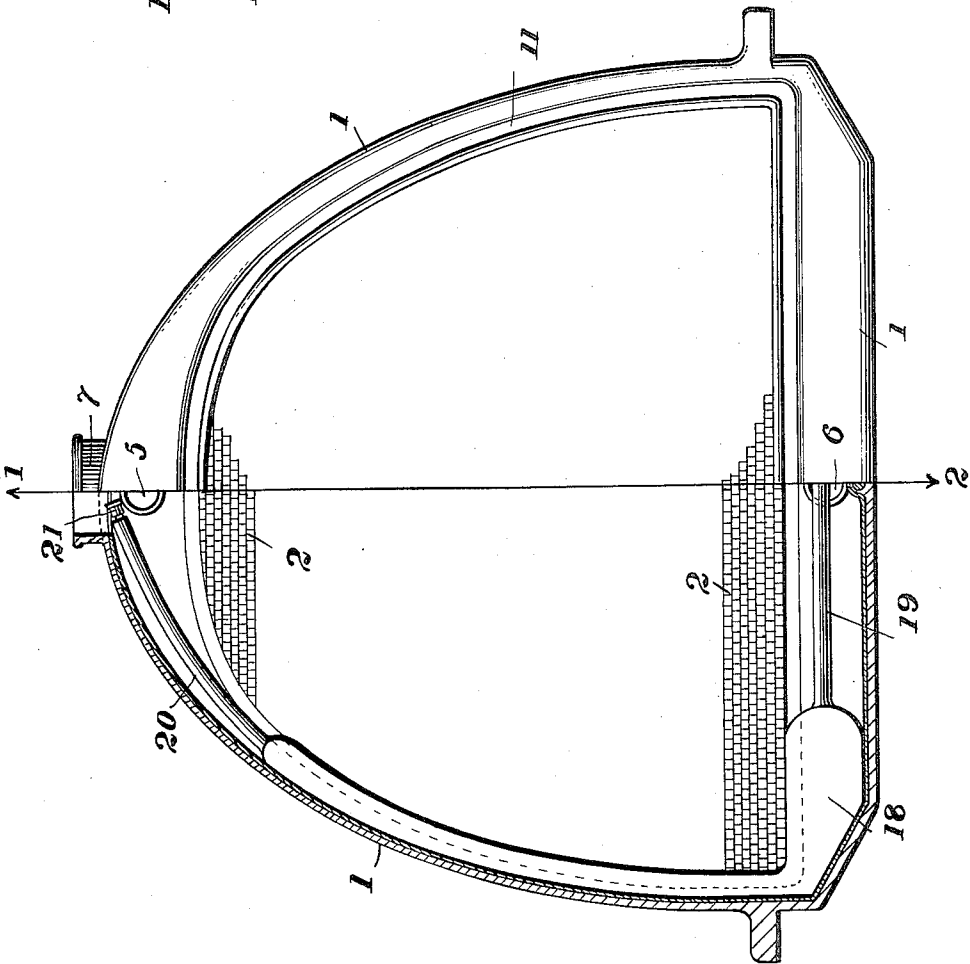


Fig. 1.



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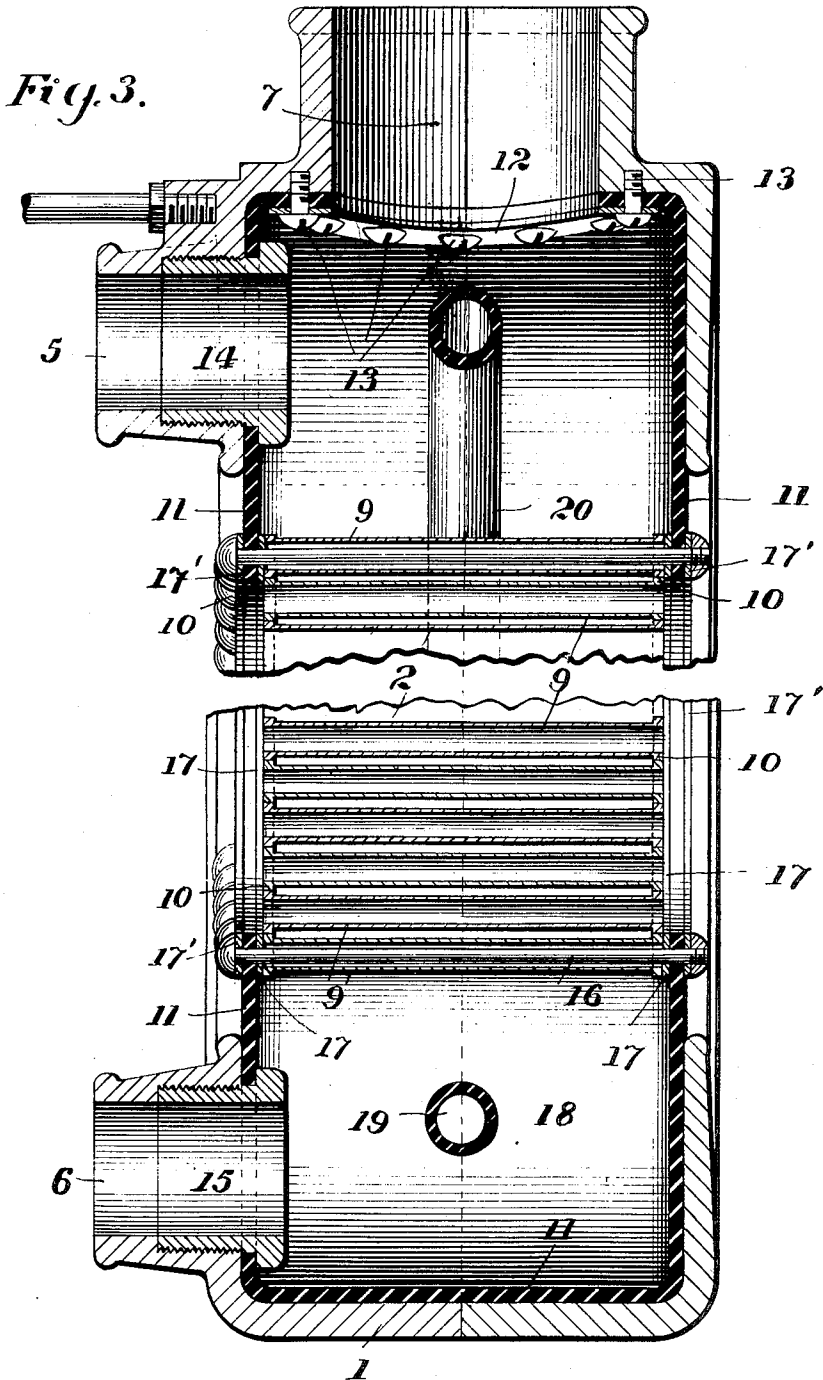
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# UNITED STATES PATENT OFFICE.

HAROLD P. SMITH AND LESLIE E. HOOKER, OF PAWTUCKET, RHODE ISLAND.

## AUTOMOBILE-RADIATOR.

942,677.

Specification of Letters Patent.

Patented Dec. 7, 1909.

Application filed August 21, 1908. Serial No. 449,737.

*To all whom it may concern:*

Be it known that we, HAROLD P. SMITH and LESLIE E. HOOKER, both citizens of the United States, residing at Pawtucket, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Automobile-Radiators, of which the following is a specification.

Our invention relates to fluid-cooling apparatus, and is more particularly designed as an improvement in radiators, such as are in common use in motor vehicles, to cool the water which circulates in the jacket surrounding the cylinders.

The object of our invention is to provide a construction whereby some of the difficulties, heretofore encountered, in maintaining such radiators in efficient condition, will be obviated.

Our invention is illustrated in the accompanying drawing, in which,

Figure 1 is a front elevation, one-half in section, of a radiator constructed according to our invention, Fig. 2 is a cross-section of the same, taken on line 1—2 of Fig. 1, and Fig. 3 is a similar view to Fig. 2, but on a larger scale, the central portion of the radiator being broken away.

In these figures, 1 represents the casing, which surrounds the honeycomb of tubes 2. Said casing may be U-shaped in cross-section and preferably made in two halves, bolted together at 3 and 4. The casing is provided with integral tubular pipe-connections at 5 and 6, for the ingress and egress of the water from and to the cylinder-jacket, and with an integral inlet opening 7, all supporting fixtures also being integral, for the supply of water.

The honeycomb 2 consists of a large number of open ended tubes 9 of thin metal, the ends 10 of which are expanded into square form, as shown, and secured together to form headers. The tubes themselves may be circular, or any other shape in cross-section; and their ends may be hexagonal instead of square, the latter form being shown for convenience in illustration. Instead of the ends being expanded, square or hexagonal collars may be shrunk, brazed or soldered on, or the tubes may be secured in head-sheets, or straight vertical tubes, the essential feature being that the tubes, with headers or butt plates, form a single unit which contains the cooling fluid and permits a free circulation of the air. This unit is secured

or suspended within the casing by a U-shaped rubber lining 11, which fits closely within said casing and may be secured thereto, around the opening 7 at the top thereof, by a strip of metal 12 and screws 13, and at the openings 5 and 6 by flanged bushings 14 and 15, inserted from inside, or other devices to serve the same purpose. The sides of this rubber lining overlap the ends of the outermost row of tubes and are perforated to admit the bolts 16, which pass through said tubes and clamp the sides of the lining thereto.

For the sake of stability, washers consisting of continuous metal strips 17 are placed between the rubber and the outermost rows of tubes, and strips 17' between the rubber and the heads of the bolts 16; the strips 17 are secured to the ends of the tubes by soldering or brazing. The unit is thus supported yieldingly and is protected against shocks, which would tend to impair the tube-joints, but as the whole weight of the unit would come upon the rubber lining, which might not be capable of supporting the same permanently, we provide a further yielding support for the unit, in the shape of a pneumatic tube 18, lying within the casing underneath the unit and also passing up around the sides thereof. This tube preferably varies in diameter, being largest at the bottom where the main weight comes, and smaller along the sides where it has merely to cushion the lateral shocks. Furthermore we reduce the diameter of the tube materially in the center of the radiator underneath the honeycomb, as shown at 19, in order to leave as much water space as possible and not interfere with the free circulation of the water, and also at the top, as shown at 20, on both sides for the same purpose and to cause all the cooling fluid to pass through the honeycomb unit. The reduced end 20 of the tube or both of them, is provided with valve and cap 21, by which the tube may be inflated.

The essence of our invention is the yielding support and cushion located between the honeycomb and the radiator casing and, believing this to be absolutely novel, we do not wish to be limited to the details or dimensions of the construction illustrated, but to be protected as broadly as expressed in the following claims:—

1. A radiator of the class described, comprising a plurality of nested tubes, a sur-

rounding casing and yielding supporting means between said tubes and casing.

2. A radiator of the class described, comprising a U-shaped outer casing, a U-shaped  
5 rubber lining within said casing and a plurality of nested tubes secured to and supported by said lining.

3. A radiator of the class described, comprising a surrounding casing, a plurality of  
10 nested tubes within said casing, elastic means secured to both said casing and said nest of tubes and additional yielding means interposed between said casing and tubes.

4. A radiator of the class described, com-

prising a U-shaped casing, a plurality of 15 nested tubes within said casing, a U-shaped lining of elastic material secured to said casing and to said tubes and a pneumatic support interposed between said tubes and bottom and sides of said casing.

In testimony whereof we affix our signatures, in presence of two witnesses. 20

HAROLD P. SMITH.  
LESLIE E. HOOKER.

Witnesses:

CHARLES M. READ,  
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