M. WITTE.

AUTOMOBILE RADIATOR.

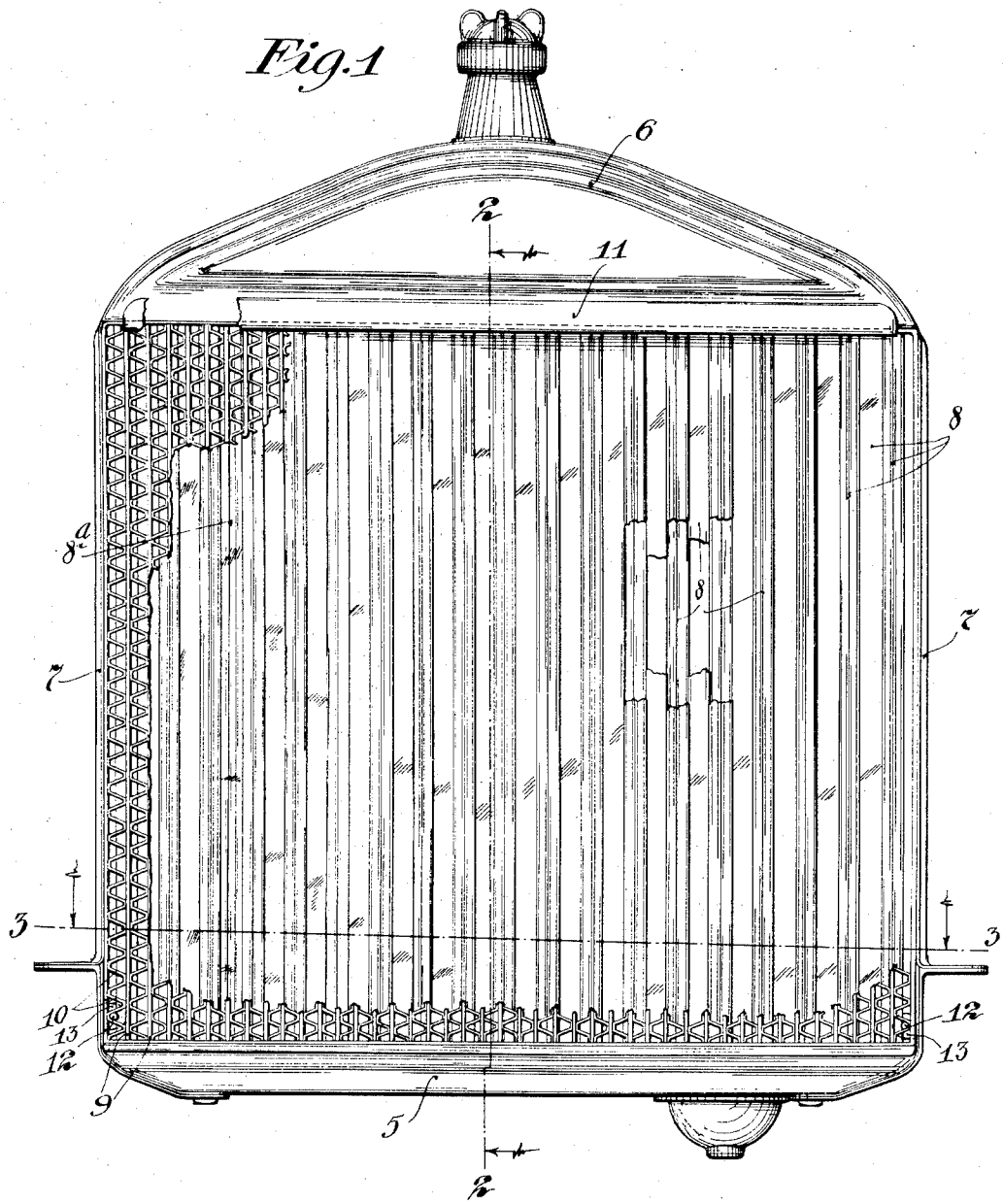
APPLICATION FILED JULY 21, 1919.

1,365,759.

Patented Jan. 18, 1921.

2 SHEETS—SHEET 1.

Fig. 1



Inventor
Meinhard Witte
By his Attorneys
William & Blackard

M. WITTE.

AUTOMOBILE RADIATOR.

APPLICATION FILED JULY 21, 1919.

1,365,759.

Patented Jan. 18, 1921.

2 SHEETS—SHEET 2.

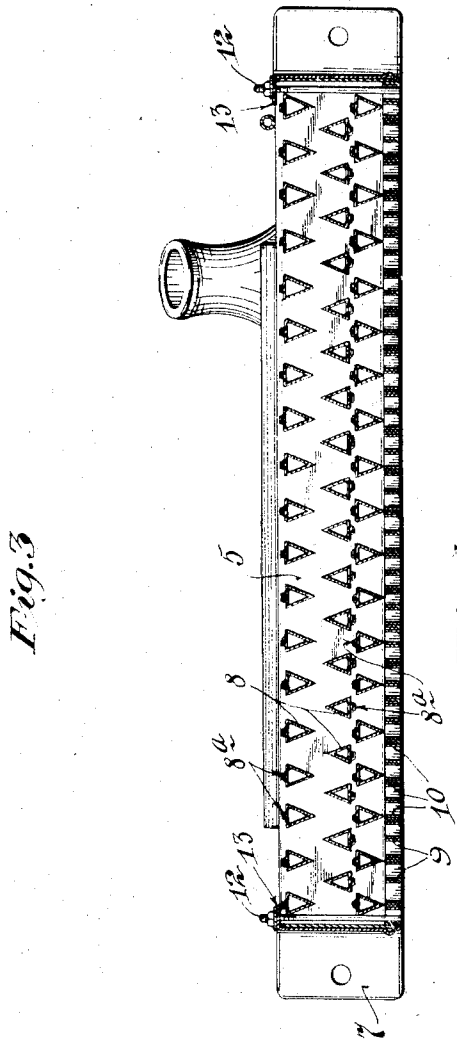


Fig. 3

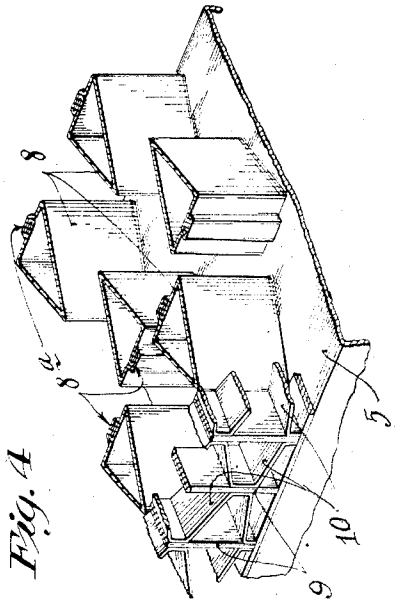


Fig. 4

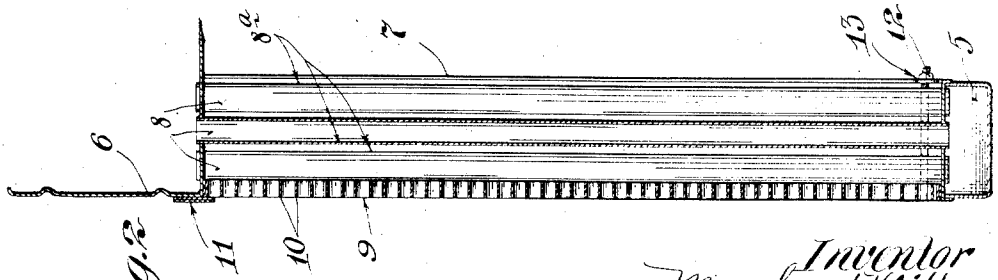


Fig. 2

Inventor
Meinhard Witte
By his Attorneys
Williamson & Merchant

UNITED STATES PATENT OFFICE.

MEINHARD WITTE, OF SPICER, MINNESOTA.

AUTOMOBILE-RADIATOR.

1,365,759. Specification of Letters Patent. Patented Jan. 18, 1921.

Application filed July 21, 1919. Serial No. 312,237.

To all whom it may concern:

Be it known that I, MEINHARD WITTE, citizen of the United States, residing at Spicer, in the county of Kandiyohi and State of Minnesota, have invented certain new and useful Improvements in Automobile-Radiators; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to automobile radiators and has for its object to improve the efficiency and general construction thereof, and the several particulars hereinafter described and defined in the claims.

The improved radiator is illustrated in the accompanying drawings wherein like characters indicate like parts throughout the several views.

Referring to the drawings:

Figure 1 is a front elevation with some parts broken away showing the radiator as constructed for application to Ford car, or the like;

Fig. 2 is a vertical section on the line 2—2 of Fig. 1, some parts being removed;

Fig. 3 is a horizontal section on the line 3—3 of Fig. 1; and

Fig. 4 is a fragmentary perspective in section showing the construction of the radiator.

The lower water tank of the radiator is indicated by the numeral 5 and the upper water tank is indicated by the numeral 6, and these tanks are connected in the usual way by a frame 7. The construction so far described may be assumed to be the ordinary Ford radiator.

The novelty is in the arrangement of the tubes that connect the lower and upper tanks. In this arrangement I employ three rows of tubes. These tubes 8 are made triangular in horizontal cross section. In some instances diamond shaped tubes may be employed, but tubes of triangular cross section are preferred. The tubes in the front row are laterally spaced and set with their sharp edges forward and flat faces alined back of the said forwardly projecting front edges. The tubes in the second row are staggered in respect to the front row, that is, they are set so that they are alined with the spacings between the front tubes and they are preferably set with their sharp edges projecting rearward and with their flat faces alined transversely of the radiator and positioned just back of the spaces between the front row of tubes. The tubes in the back or third row are set in alinement with those of the front row, that is, they are set with their sharp edges projecting forward and alined with the spaces between the second row of tubes. The said two groups are practically formed from cheap copper or brass bent to form the tubes and united by seams 8^a. Here, it is important to note that these seams which are preferably folded, and soldered, may be repaired without removal of any of the tubes. For example, the seams 8^a of the second row of tubes may be repaired through the spaces of the front row of tubes; the seams of the front row of tubes may be repaired through the spaces between the rear and second row of tubes; and the seams of the rear row of tubes may be repaired readily from the rear of the radiator. This arrangement obviously permits repairs of the tubes without removal of the radiator from the machine.

The above arrangement of tubes also affords a very highly efficient radiator. The air passes between the front row of tubes when coming in direct contact with the flaring walls thereof, and will strike the flat faces of the second row of tubes and be reflected laterally, so that the air will then pass over to the rear walls of the front row of these, the air will then pass between the tubes of the second row and in contact with the rearwardly diverging walls thereof, and the same will be directed against the rearwardly diverging walls of the tubes of the rear rows. The tubes of triangular cross section combined with upper and lower tanks is believed to be novel and is known to be highly important. The tube triangular in cross section has a maximum amount of exposed radiating surface for a given cross section and water conducting capacity. Tubes of triangular cross section have greater exposed radiating surface for given water capacity or cross section than square tubes, or tubes of any other polygonal cross section. As compared, for example, with tubes that are diamond shaped in cross section having the conducting capacity of two triangular tubes put together, the two triangular tubes, have two more exposed sides than such diamond shaped tube. Also, the

staggered arrangement of certain thereof having forwardly converging and certain thereof having rearwardly converging surfaces is important because it gives not only large radiating surface, but an arrangement in which the air, in passing through the radiator, must make good contact with such radiating surface.

As an additional and quite important feature, I provide a grate which is detachably secured to the radiator tank and frame in front of the tubes. This grate is preferably made up of a plurality of laterally spaced thin metal bars 9 and interposed spacing thin metal strips 10, said elements 9 and 10 being soldered or otherwise rigidly secured together so that the grate, as an entirety, may be applied or removed. The front row of tubes is set back from the front edges of the lower and upper tanks 5 and 6 so as to afford a space for this grate. To properly hold the grate in working position, the top tank 6 is shown as provided with a receiving strip 11 mounted thereto and extending below the bottom of the upper tank. The upper edge of this grate being inserted into the space back of the lower edge of the strip 11 and its lower edge being placed on the projected forward top portion of the lower tank 5, the said grate can be securely and firmly, but detachably secured in position by small nut equipped bolts 12, passed through said grate, between the radiator tubes and through flanges 13 that project upward from the said lower tank 5. This grate gives the radiator an appearance of a cellular radiator, but it does more than that, in that it divides the air into a multiplicity of streams that are directed against the radiator surfaces of the tubes; moreover, this grate protects the tubes from damage. The efficiency of the above radiator has been demonstrated in actual practice. Furthermore, in freezing temperature, these triangular shaped tubes will assume a circular shape if water should freeze within, thus taking up the co-efficient of expansion of water during freezing, preventing the bursting of the tubes.

What I claim is:

1. An automobile radiator comprising rows of tubes of triangular cross section, the tubes of adjacent rows being arranged in staggered relation and facing in opposite directions.

2. An automobile radiator comprising upper and lower tanks and rows of tubes of triangular cross section connecting said tanks, the tubes of alternate rows being arranged in staggered relation and having their sides converging in opposite directions.

3. An automobile radiator comprising upper and lower tanks and tubes connecting the same, said tubes being arranged in front, rear, and intermediate rows, the front row of tubes having forwardly converging surfaces, the intermediate row of tubes having rearwardly converging surfaces and flat faces exposed alined with the spaces between the tubes of the front row, and the third row of tubes having forwardly converging surfaces alined with the spaces between the said intermediate row of tubes.

4. An automobile radiator comprising upper and lower tanks and tubes connecting the same, said tubes being arranged in front, rear, and intermediate rows, the front row of tubes having forwardly converging surfaces, the intermediate row of tubes having rearwardly converging surfaces and flat faces exposed alined with the spaces between the tubes of the front row, and the third row of tubes having forwardly converging surfaces alined with the spaces between the said intermediate row of tubes, and grate detachably secured in respect to said tanks, in a position in front of the front row of tubes.

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

MEINHARD WITTE.

Witnesses:

WINIFRED I. WARD,

HARRY D. KILGORE.