

H. REIS & E. BEHRINGER.
RADIATOR.

APPLICATION FILED JULY 23, 1912. RENEWED OCT. 16, 1913.

1,109,941.

Patented Sept. 8, 1914.

Fig. 1. Fig. 5. Fig. 2.

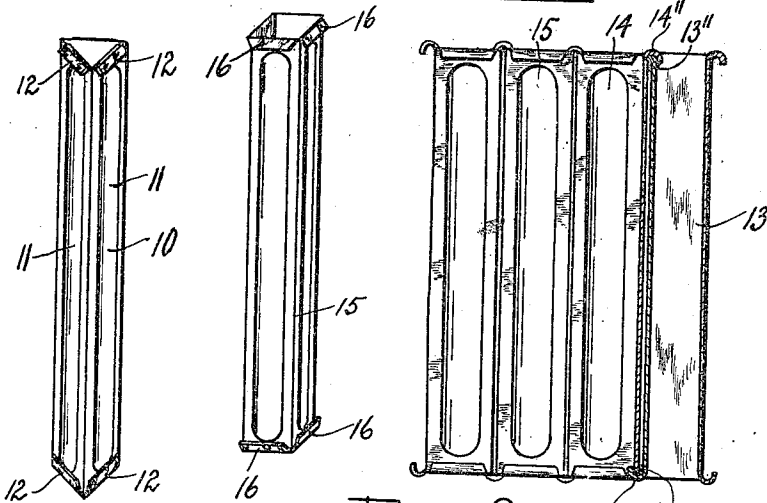


Fig. 4

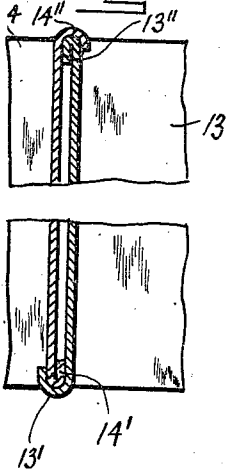


Fig. 3.

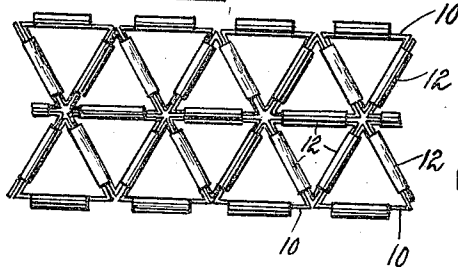


Fig. 7.

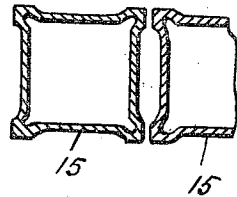
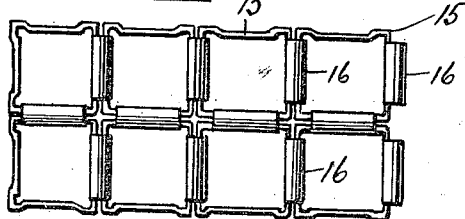


Fig. 6.



WITNESSES

Dr. H. Klink
S. Birnbaum

Herman Reis INVENTORS
Erhardt Behringer
BY
Sigmund Herzog ATTORNEY

UNITED STATES PATENT OFFICE.

HERMAN REIS AND ERHARDT BEHRINGER, OF NEW YORK, N. Y.

RADIATOR.

1,109,941.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that we, HERMAN REIS and ERHARDT BEHRINGER, citizens of the United States, and residents of the city of New York, in the counties of New York and Kings, respectively, and State of New York, have invented certain new and useful Improvements in Radiators, of which the following is a specification.

The present invention relates to radiators used upon motor cars and the like for cooling the water circulating in the water jacket around the engine cylinders.

More particularly, the invention relates to that type of radiators which are termed "honey-comb" radiators.

One of the objects of the invention is to produce a radiator of a plurality of tubular elements which are all alike, whereby the manufacture of the radiator and the assembling of the tubular elements is greatly simplified.

Another object of the invention is to provide tubular elements of such design that any desired quantity of the same can be associated side by side indiscriminately, that is to say without drawing a distinction as to which one of the ends of an element should come together with one or the other end of a juxtaposed element, and furthermore without drawing distinction as to which of the sides of the two juxtaposed elements should meet.

A further object of the invention is to associate the elements of the radiator side by side in such a manner that the water spaces formed between the elements should run in straight lines from side to side or end to end of the radiator so as to permit of a convenient and quick cleaning of the water spaces in case they become clogged.

With these and other objects in view, which will more fully appear as the nature of the invention is better understood, the same consists in the combination, arrangement and construction of parts hereinafter fully described, pointed out in the appended claim and illustrated in the accompanying drawings, it being understood that many changes may be made in the size and proportion of the several parts and minor details of construction within the scope of the appended claim without departing from the spirit or sacrificing any of the advantages of the invention.

Two of the many possible embodiments of

the invention are illustrated in the accompanying drawings, in which:—

Figure 1 is a perspective view of a tubular element of a radiator constructed in accordance with the present invention; Fig. 2 is a side elevation of a group of elements; Fig. 3 is a front elevation of the same; Fig. 4 is an enlarged sectional view showing the manner in which opposite elements are joined; Fig. 5 is a perspective view of a modified tubular element; Fig. 6 is a front elevation of a group of these modified elements; and Fig. 7 is a transverse section taken through two modified elements as they appear in juxtaposition.

Referring now more particularly to Figs. 1 to 4, inclusive, the numeral 10 indicates one of the tubular elements of which the radiator is formed. This element is of equilateral triangular cross section and of uniform width throughout, including the end portions. The sides of the element are provided each with a longitudinal groove 11, stopping short of the ends, to strengthen the tubes and to afford water reservoirs. The tube is provided at both ends of its three sides with similarly hooked lips 12, 12. The elements are made of comparatively thin sheet metal and may be drawn, or built up of a suitably prepared blank the meeting edges of which are soldered in the well known manner. Those portions of the blank which constitute the lips are then bent back into planes substantially parallel with their respective sides and at a substantial distance from said sides. It is to be noted that the lips of each end of a tubular element are similarly hooked and that the distances between the same and their respective sides of the element are the same upon all sides and both ends. These elements are indiscriminately associated side by side to form rows in all directions. The elements are, preferably, assembled upon a table on which are arranged a plurality of pins in predetermined proximity to each other to guide and hold in position the said tubular elements. One way of assembling the same may be stated to be as follows: With reference to Fig. 2 of the drawings, it is to be noted that first the tubular element, denoted by the numeral 13, is placed in an indiscriminate manner upon a pin of the table. By indiscriminate it is meant that it makes no difference which one of the ends is placed upon the table and which one of the sides

is to meet a side of another element. Taking then hold of the tube, denoted by the numeral 14, the same is placed into engagement indiscriminately with the next pin upon the table and slid close to the element 13 toward the table. In doing so, the lip 14' of the tubular element 14 will be caused to abut against its corresponding side, and so will also the lip 13'' of the element 13 be forced against its corresponding side. The lip 14'' of the element 14 will be drawn over the lip 13'' of the element 13 and engage the inner surface of that side of the element 13 on which the lip 13'' is formed. In a similar manner will the lip 13' of the element 13 be drawn over the lip 14' of the element 14. Taking then hold of the element, denoted by the numeral 15, and sliding the same indiscriminately over its corresponding pin, the lips upon its side adjacent to the element 14 will be formed and engaged in the same manner as the lips 14' and 14'' of the element 14, and those lips of the element 15 which are adjacent to the element 14 will be formed in the same manner as the lips 13' and 13'' of the element 13. From the foregoing it will be seen that, as the lips upon two adjacent sides of two opposite elements are engaged with each other, the said lips will act as spacers between the elements and at the same time as means for interlocking the same. More particularly, those lips which are squeezed against corresponding sides will cause two adjacent sides of two juxtaposed elements to lie apart sufficiently to admit of a cooling liquid flowing between the same, and those lips which are brought into engagement with the inner surfaces of the sides of the juxtaposed elements form the interlocking means. After the tubes have been assembled, the ends of the same are dipped into a solder bath to properly confine the cooling fluid which flows between the external surfaces of the several tubes, the internal surfaces of the elements remaining open to the atmosphere. Another way to assemble the tubes would be to place the same indiscriminately over the pins above mentioned and then force all of the same simultaneously toward and into contact with the support. By forcing them

toward the support, the lips upon the sides of the same will be engaged in the same manner as hereinabove described with the exception that it cannot be predetermined which of the same will form spacing lips and which of the same will form interlocking lips.

In Figs. 5 to 7, inclusive, a modification of the invention is shown which differs from the one hereinbefore described in that its tubular element 15 is square. Its lips 16 are formed in the same manner as those of the element shown in Fig. 1 of the drawings, and its way of assembling is also the same.

It should be noted that while herein elements of triangular and square cross sections have been shown, tubes of any other polygonal cross section may be made use of.

It is to be observed that the water spaces of the radiator can be easily cleaned for the reason that they run in straight lines from side to side of the radiator frame. It is, therefore, very convenient to insert a sheet metal scraper or blade which can be run in straight lines through said spaces. It is to be noted furthermore that the construction shown in Fig. 3 of the drawings is of hexagonal configuration, that is to say six elements of the same meet at a common center, for which reason the flow of the water from the upper water chamber of the radiator to the lower one will be retarded and, therefore, the best cooling effect obtained.

What we claim is:—

A radiator unit comprising a polygonal tube having similarly hooked lips upon all sides and both ends thereof, the bends of the lips upon each end of the tube being arranged in the same plane and the distances between the said lips and the respective sides of the tube being the same upon all sides and both ends.

Signed at New York, in the county of New York and State of New York, this 22nd day of June, A. D. 1912.

HERMAN REIS.

ERHARDT BEHRINGER.

Witnesses:

SIGMUND HERZOG,
S. BIRNBAUM.