

A. DIPPERT.
RADIATOR FOR AUTOMOBILES AND THE LIKE.
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1,014,816.

Patented Jan. 16, 1912.

Fig. 1.

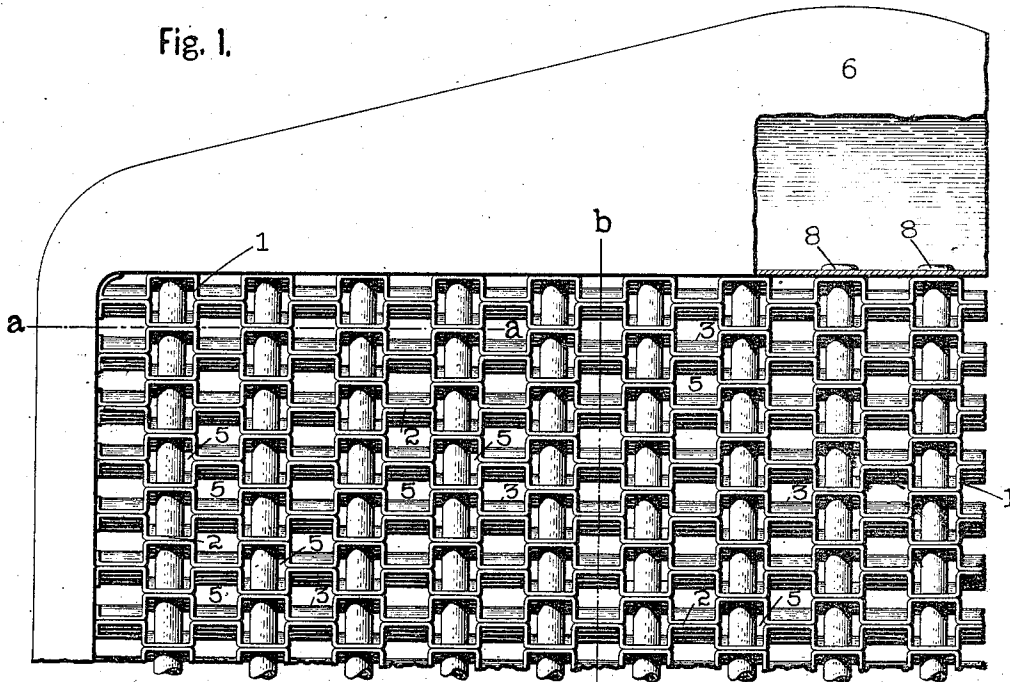


Fig. 2.

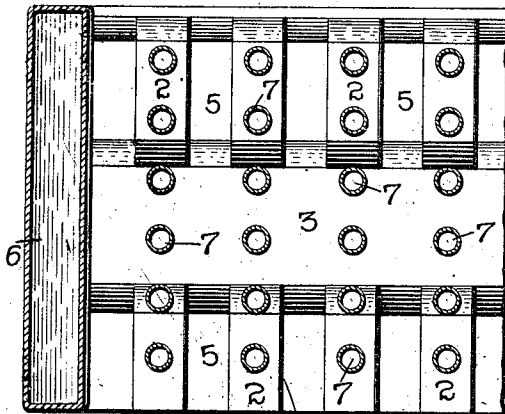


Fig. 3.

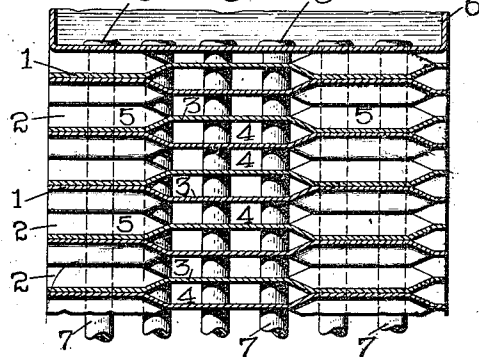
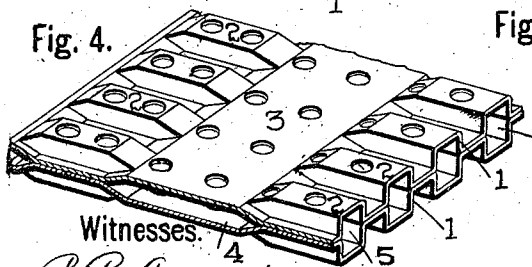


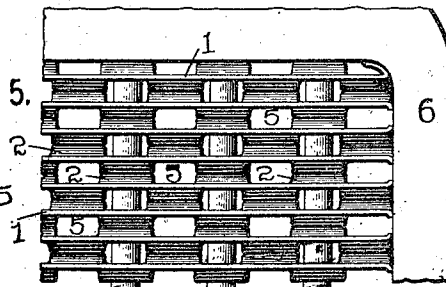
Fig. 4.



Witnesses.

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Fig. 5.



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RADIATOR FOR AUTOMOBILES AND THE LIKE.

1,014,816.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, ALFRED DIPPERT, a citizen of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Radiators for Automobiles and the Like, of which the following is a specification.

This invention relates to improvements in radiators employed in connection with the cooling systems of internal combustion motors which are utilized as the source of power for automobiles and the like.

The main object of the invention is to secure a uniform, even and thorough cooling effect. This is accomplished by providing the radiator with both longitudinal and transverse air passages, which extend at angles to, and cross or intersect each other, and thereby forming communicating passages.

The invention also relates to certain details of construction which will be hereinafter described and claimed, reference being had to the accompanying drawings, in which—

Figure 1 is a fragmentary front elevation of the improved radiator also showing a short fragmentary section through the water compartment or tank. Fig. 2 is a fragmentary horizontal section through the improved radiator on line *a a*, Fig. 1. Fig. 3 is a fragmentary vertical section through the improved radiator on line *b b*, Fig. 1. Fig. 4 is a fragmentary perspective view showing a portion of two of the plates or fins of the radiator joined together. Fig. 5 is a rear elevation of a fragment of the improved radiator.

In referring to the drawings in detail, like numerals designate like parts.

This improved radiator is preferably employed in connection with the cooling system of a water-cooled internal combustion motor which forms the source of power of the conventional type of automobile.

The radiator is preferably located at the front of the automobile body in the usual and well-known way.

This improved radiator consists of a series of plates superimposed on each other, each of which is provided with a plurality of corrugations which constitute air passages, and a series of water tubes or conduits

which extend transversely through the plates.

In the form of the improved radiator shown in the accompanying drawings, each of the plates or fins 1 is provided with a plurality of corrugations 2 which extend across the plate from side to side thereof. These corrugations 2, however, do not extend continuously across the plate as they are interrupted at regular intervals by flat raised portions 3 which extend at approximately right angles to the corrugations. By referring to Fig. 4, this unique form of the plates or fins will be easily understood. In said Fig. 4 it will be noted that the flat sections or portions 3 of the plates or fins, when said plates or fins are in their superimposed position in the completed radiator, are arranged in separated opposed pairs which form longitudinally extending air passages 4 which cross or intersect the transverse air passages 5 and form communicating passageways for the air between said transverse air passages 5. The transverse air passages 5 extend completely through the radiator from the front side to the rear side thereof, while the longitudinally extending air passages extend lengthwise through the radiator from end to end thereof. The transverse air passages 5 are each divided into a series of separated sections by the intersecting longitudinal air passages, as shown particularly in Figs. 2 and 4, and to afford communication between the transverse air passages and the longitudinal air passages the longitudinal air passages are provided with side openings which communicate with the ends of the separated sections of the transverse air passages.

Suitable tanks or reservoirs 6 are provided at the sides, top and bottom of the radiator in order that a sufficient amount of water for cooling purposes may be carried. These tanks are connected in the usual manner by water tubes or conduits 7 which extend transversely through the radiator, as shown in the accompanying drawing.

It will be noted by referring to Fig. 1 that the water tubes or conduits 7 extend at approximately right angles to the longitudinally extending air passages 4. Both the longitudinal air passages and the water tubes or conduits extend at angles to each

other through the radiator from edge to edge thereof.

The transverse air passages 5 extend horizontally through the radiator from face to face thereof and at an angle to both the longitudinal air passages and the water tubes or conduits.

It will be noted by referring to Figs. 1 and 4 that the corrugations in the plates or fins are so shaped that substantially square openings are presented at the front or outer mouth of the transverse air passages. However, the corrugations may be differently formed or shaped to give a different figuration to the transverse air passages, if it is desired.

The plates of this improved radiator are secured together in superimposed position by soldering or otherwise fastening their abutting portions or parts. The water tubes or conduits 7 have their upper ends extended through the walls of the water reservoir, and are flanged outwardly upon said walls, as shown at 8 in Figs. 1 and 3. These flange portions may also be soldered as an additional precaution if desired, to prevent leaking. The plates or fins, tubes and water reservoirs may be constructed of any suitable material, such as sheet steel, copper and the like.

In the form of the radiator illustrated, the transverse air passages extend through the radiator from the front face to the rear face, and the longitudinal air passages extend horizontally through the radiator from one side edge to the other side edge. The water tubes or conduits also extend through the radiator from the top to the bottom thereof.

In the form of the radiator shown in the accompanying drawings, the transverse air passages are arranged in vertical rows and said rows are divided into two sections and each of said sections is composed of alternate rows of transverse air passages. The rows of air passages of one section are interposed between the rows of air passages of the other section and the air passages of each row of one section are arranged in a slightly different plane from that of the air passages of the other section, as shown in Fig. 1.

The vertical tubes or conduits are arranged in transverse rows and extend vertically through the rows of transverse air passages of one of the sections, as shown in Figs. 1 and 2. Every transverse air passage is connected at intervals to the adjacent air passages of its own section,—i. e., the second transverse air passage on either side thereof by portions of the longitudinal air passages. The longitudinal air passages are preferably made wider but not as deep as the transverse air passages, being sufficiently wide to extend transversely between and

connect on their sides to some of the transverse air passages. It will be noted that each of the longitudinal air passages is so arranged and located that it extends directly through one of the transverse air passages of each row of one section and is connected on its sides to the adjacent air passages of the other section, as shown in Figs. 2, 3 and 4.

The members or plates may be secured together by fastening the parts which separate the corrugations of the pairs, or they may be merely tied together by the vertical water tubes or conduits, as shown in Fig. 4.

The motor of an automobile equipped with this improved radiator will be efficiently cooled owing to the fact that the cooling air is permitted to pass all around the water tubes and thus uniformly and evenly cool the same.

The members or plates are not cut or slit at all, as the passages between them are formed by bending or shaping the metal to provide channels each of which constitutes one-half of one of the air passages. The channels are closed at their sides except where the longitudinal air passages intersect the transverse air passages. Owing to the unslitted condition of the plates they are necessarily very stiff and strong and form an extremely durable radiator.

The great advantage of this invention is that both transverse and longitudinal air passages are provided which enable currents of air to pass completely around the water tubes.

While the water tubes are shown as extending vertically in the accompanying drawings, it is obvious that they may be extended horizontally or at an angle without departing from my invention, as set forth in the following claims. Likewise the longitudinally extending air passages may be arranged vertically or at an angle instead of horizontally. Other changes and modifications may be resorted to within the scope of the following claims without departing from my invention.

Another advantage of the form of this improved radiator illustrated in the accompanying drawing is that from the front it presents the appearance of a square tube honeycomb radiator.

I claim:—

1. In a radiator, a plurality of superimposed fins formed intermediate their front and rear edges to provide separate superimposed longitudinal passages, the front and rear portions of said fins on opposite sides of the longitudinal passages being formed to provide inner and outer sets of passages disposed at an angle to the aforesaid passages and communicating with the first named passages, and a plurality of water pipes intersecting and piercing said passages

the inner ends of the inner and outer sets of passages being contracted so that air currents are forced into and out of the first named passages.

- 5 2. In a radiator, a plurality of superimposed fins formed to provide separate superimposed longitudinal passages and also formed to provide inner and outer sets of passages disposed at an angle to the afore-
- 10 said passages, the longitudinal passages being more shallow than the inlet and outlet ends of the outer and inner passages respec-

tively, and a plurality of water pipes piercing and extending through said passages, the inner ends of the inner and outer sets of passages being contracted so that air currents are forced into and out of said longitudinal passages, whereby the air currents are retarded in their flow through the passages to cool the tubes.

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Witnesses:

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."