L. H. BRINKMAN.

RADIATOR FOR MOTOR VEHICLES.

APPLICATION FILED JULY 16, 1904.

953,252.

Patented Mar. 29, 1910.

2 SHEETS—SHEET 1.

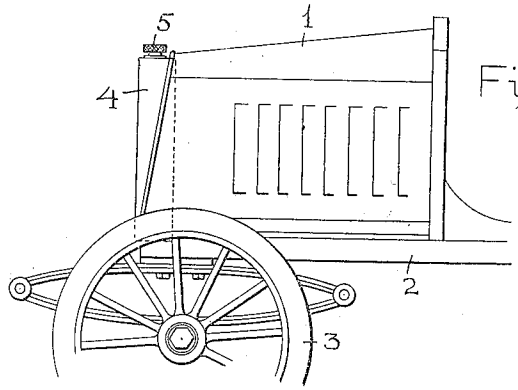

Fig. 1.

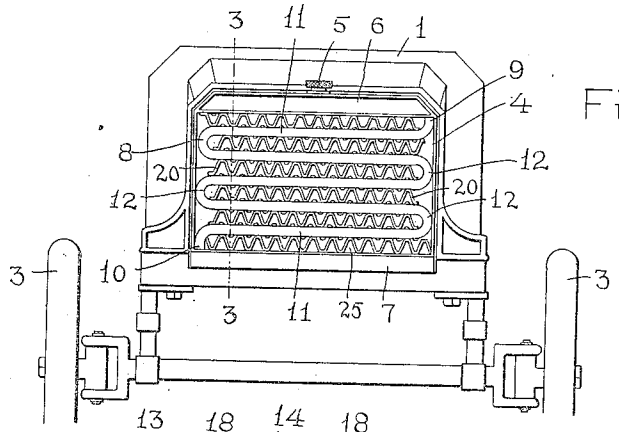

Fig. 2.

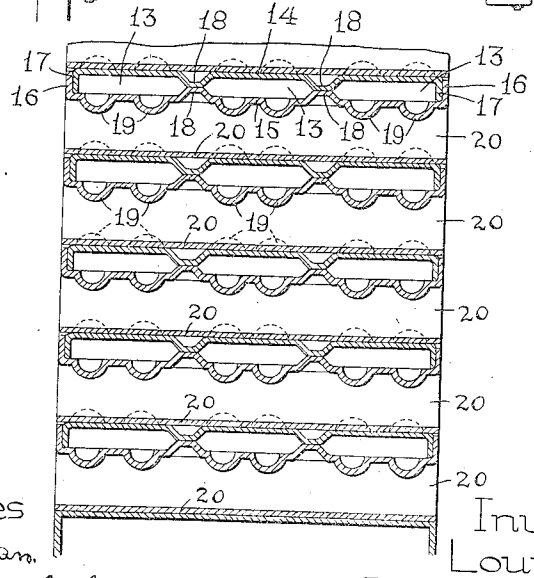

Fig. 3.

Witnesses

Roy D. Tolman.

Penelope Comberback.

Inventor

Louis H. Brinkman

By Rufus B. Fowler

Attorney

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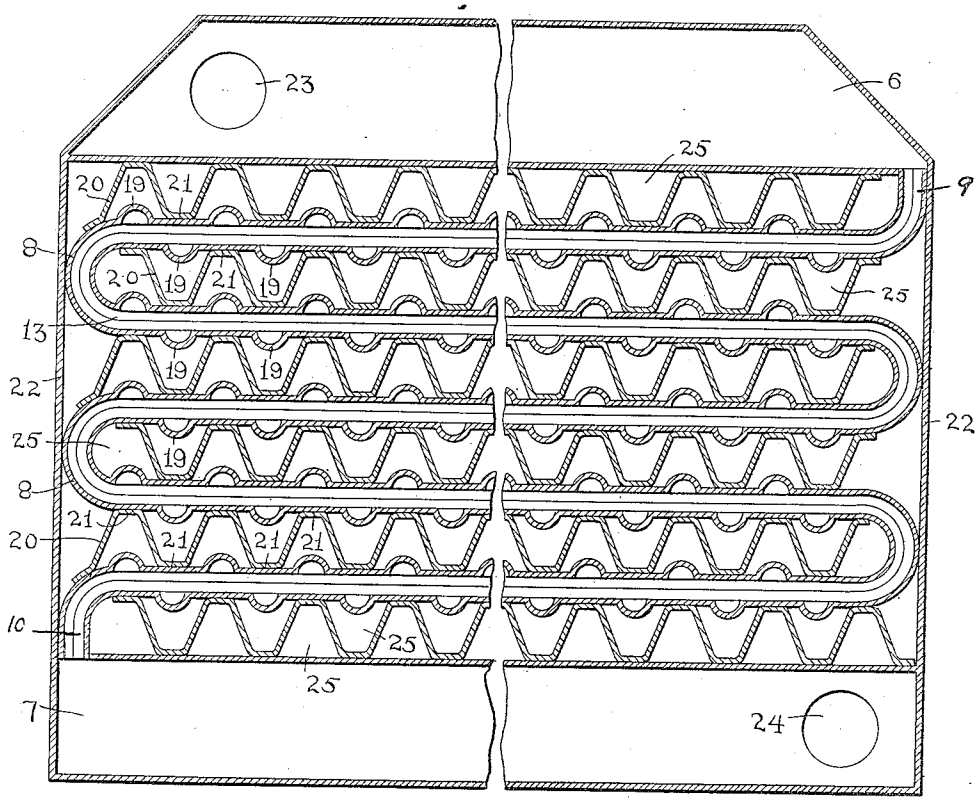

Fig. 4.

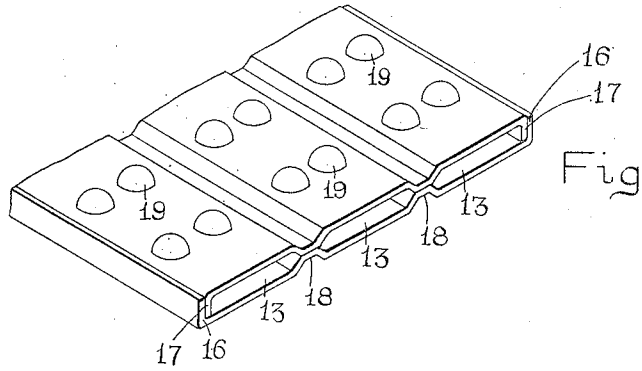

Fig. 5.

Witnesses.

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UNITED STATES PATENT OFFICE.

LOUIS H. BRINKMAN, OF WEST HARTFORD, CONNECTICUT, ASSIGNOR TO WHITLOCK COIL PIPE COMPANY, OF WEST HARTFORD, CONNECTICUT, A CORPORATION OF CONNECTICUT.

RADIATOR FOR MOTOR-VEHICLES.

953,252. Specification of Letters Patent. Patented Mar. 29, 1910.

Application filed July 16, 1904. Serial No. 216,785.

To all whom it may concern:

Be it known that I, LOUIS H. BRINKMAN, a citizen of the United States, residing at West Hartford, in the county of Hartford and State of Connecticut, have invented a new and useful Improvement in Radiators for Motor-Vehicles, of which the following is a specification, accompanied by drawings forming a part of the same, in which—

Figure 1 represents a side view of my improved radiator as applied to a motor vehicle. Fig. 2 is a front view of the same. Fig. 3 is a vertical sectional view of a portion of the radiator shown on line 3—3, Fig. 2. Fig. 4 is a vertical sectional view on a plane at right angles to that shown in Fig. 3, and Fig. 5 is a perspective view of a detached portion of the water pipes.

Similar reference letters and figures refer to similar parts in the different views.

My present invention has for its object to reduce the cost and to increase the durability and efficiency of that class of radiators which are employed in motor vehicles as a part of a water circulating system for the purpose of cooling the cylinders of explosive engines, and it consists in the construction and arrangement of parts as hereinafter described, the novel features being pointed out in the annexed claims.

Referring to the accompanying drawings, 1 denotes the hood or bonnet of a motor vehicle, 2 a portion of the chassis, 3 the front wheels, and 4 a water cooling radiator embodying my invention, having an opening in the top closed by a cap 5 for the purpose of filling the radiator with water. The radiator 4 comprises an upper water chamber 6 and a lower water chamber 7, said chambers being connected with the jacketed space around the engine cylinder in the usual and wellknown manner in radiators of this class. The upper chamber 6 and the lower chamber 7 are connected together by serpentine water pipes 8 having their upper ends connected at 9 with the upper water chamber 6, and their lower ends connected at 10 with the lower water chamber 7.

The water pipes 8 are preferably arranged in a series of horizontal sections 11 connected by return bends 12, 12, and forming continuous passages 13, 13, by which water may flow from the chamber 6 downwardly to the chamber 7. In the sectional views, Figs. 3 and 4, and in the perspective view, Fig. 5, I have shown what I consider a preferable form of construction of the water pipes 8, which consists in inclosing the water passages 13, in the present instance three in number, between two sheet metal plates 14 and 15 having their edges turned to form flanges 16 and 17 which overlap and are soldered together to form a watertight joint. The plates 14 and 15 are preferably pinched together at 18 to divide the inclosed space between the plates 14 and 15 into three separate water passages 13, Fig. 3. Each of the plates 14 and 15 before being united, are stamped by suitable punches and dies to form the raised protuberances 19 in order to increase the radiating surfaces of the plates. The horizontal sections 11 of the pipes 8 are separated by corrugated radiating plates 20. The corrugations of the plates 20 are alternately attached at 21 to the surfaces of the water pipes 8 so that the heat given to the water pipes by the circulating hot water within the passages 13 will be imparted to the corrugated radiating plates 20.

The water chambers 6 and 7 are preferably connected at each end of the radiator by plates 22, Fig. 4, forming an inclosing case for the ends, but the front and rear sides are left entirely open to form unobstructed air passages between the pipes 8 and the convolutions of the corrugated plates 20, through which currents of cooling air are caused to pass by the motion of the motor car or by other suitable means, such as a rotary fan, commonly employed with radiating devices of this class.

The corrugated plates 20 and the pipes 8 are preferably formed from thin sheets of copper, brass, or other metal capable of a rapid radiation of heat, and the employment of the corrugated plates 20 increases the amount of metallic surface brought in contact with the cooling currents of air, thereby adding to the cooling efficiency of the apparatus. An opening 23 is provided in the chamber 6 through which water is received from the engine cylinder and an opening 24 is provided in the lower chamber 7 through which water is returned to the cylinders, the circulation between the cham-

bers 6 and 7 being maintained either by the difference in specific gravity between the heated and partially cooled water or by means of a pump as is usually employed in radiators of this class.

The water pipes 8 are flattened on their upper and lower surfaces to restrict the inclosed water passages 13, so that the current of water is obliged to flow in close proximity to the flattened sides of the water pipes and also to form surfaces in which the raised protuberances 19 may be formed. The flattened sides of the water pipes and the surfaces of the corrugated plates 20, form air flues 25 through the structure, through which cooling currents of air pass.

What I claim as my invention and desire to secure by Letters Patent is:—

1. In an apparatus of the class described, the combination of a flattened water pipe formed of parallel plates with longitudinal depressions in each plate in contact, and with the edges of each plate bent at right angles and fastened together.

2. In an apparatus of the class described, horizontal chambers, a flattened water pipe connecting said chambers, said pipe comprising horizontal sections and reverse bends and formed from two plates parallel throughout the length of the pipe, with longitudinal depressions in each plate in contact throughout each horizontal section and with the edges of each plate bent at right angles and fastened together.

3. In an apparatus of the class described, horizontal chambers, a flattened water pipe connecting said chambers, comprising horizontal sections and reverse bends and formed of parallel plates, each plate having opposite longitudinal depressions in each section in contact to increase the radiating surface of said pipe, each plate also provided with protuberances arranged between said depressions, and a corrugated plate between said horizontal sections arranged to contact with said pipe between said protuberances and transverse to said depressions.

4. In an apparatus of the class described, horizontal chambers, a flattened water pipe connecting said chambers, comprising horizontal sections and reverse bends and formed from two plates parallel throughout the length of the pipe, having in said horizontal sections opposite longitudinal depressions in each plate, with the bottoms of said opposite depressions parallel and in contact, and a corrugated plate between said sections in contact with said pipe transverse to said depressions.

Dated this twelfth day of July, 1904.

LOUIS H. BRINKMAN.

Witnesses:

EDWARD D. REDFIELD,

EDWIN H. TUCKER.