H. KLEIN.

RADIATOR FOR AUTOMOBILES.

APPLICATION FILED SEPT. 15, 1910.

975,872.

Patented Nov. 15, 1910.

2 SHEETS—SHEET 1.

Fig. 1

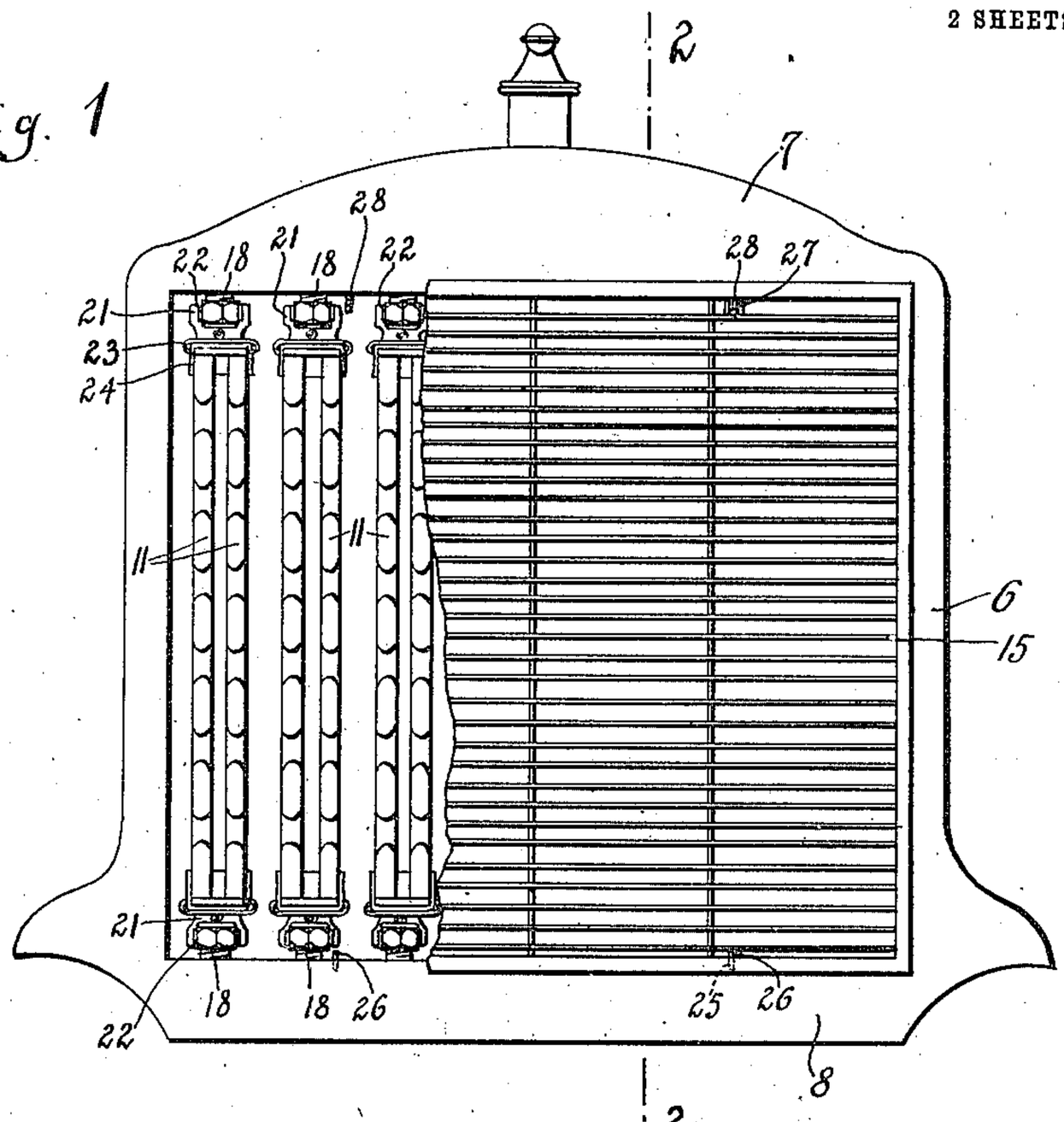
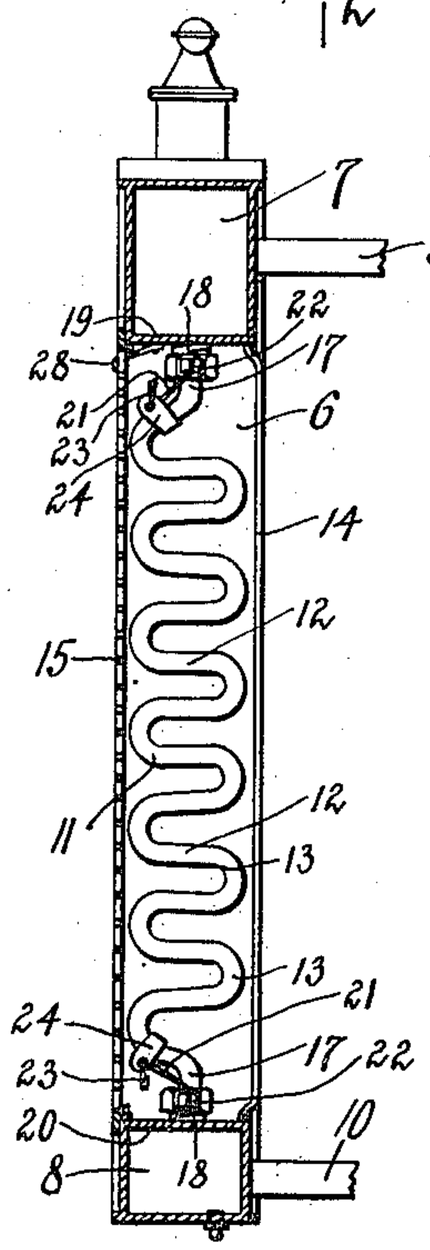


Fig. 2



WITNESSES

William Reiter

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Fig. 3

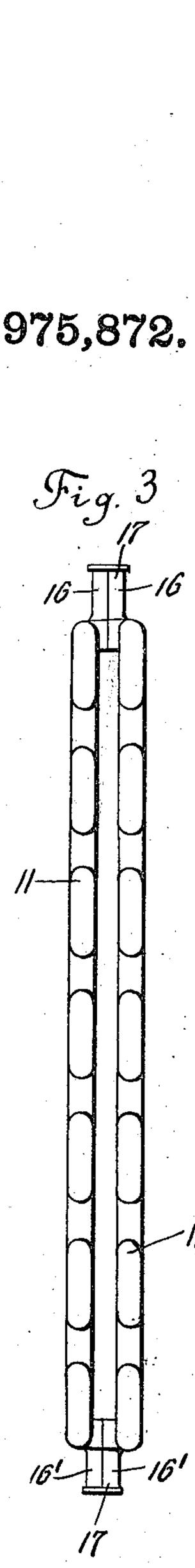


Fig. 4

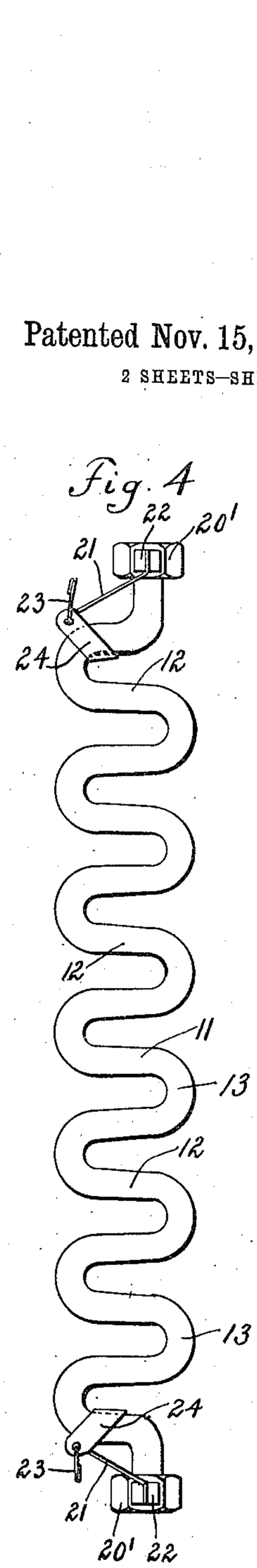
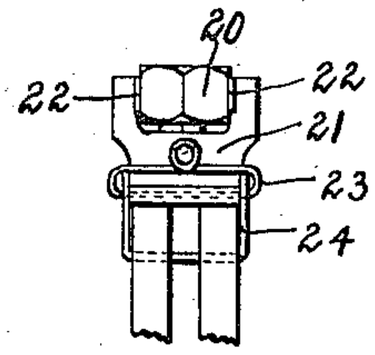


Fig. 5



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UNITED STATES PATENT OFFICE.

HERMANN KLEIN, OF NEW YORK, N. Y., ASSIGNOR OF ONE-THIRD TO WILLIAM REITER, OF NEW YORK, N. Y.

RADIATOR FOR AUTOMOBILES.

975,872.

Specification of Letters Patent. Patented Nov. 15, 1910.

Application filed September 15, 1910. Serial No. 582,194.

To all whom it may concern:

Be it known that I, HERMANN KLEIN, a subject of the King of Hungary, and a resident of the city of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Radiators for Automobiles, 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 cylinder.

One of the objects of the invention is to provide a very simple, durable and inexpensive radiator by means of which the maximum cooling effect can be obtained.

Another object of the invention is to provide a radiator in which the joints between the water chambers and the connecting tubes are reduced to a minimum.

A further object of the invention is to arrange the tubes of the radiator in such a manner that the greatest possible area of radiating surface of the same is exposed to the air currents.

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

One of the many possible embodiments of the invention is illustrated in the accompanying drawings, in which:—

Figure 1 is a front elevation of a radiator constructed in accordance with the present invention, part of the protecting grate being removed so as to more clearly show the interior construction of the same; Fig. 2 is a section taken on line 2, 2 of Fig. 1; Fig. 3 is an enlarged front elevation of a pair of fluid tubes; Fig. 4 is a side elevation thereof; and Fig. 5 is a front elevation of a detail of construction.

In the drawings, the numeral 6 indicates the casing of the radiator, which is provided with an upper water chamber 7, and a lower water chamber 8. To the upper chamber leads an inlet tube 9 from the water jacket of the engine, while an outlet tube 10 leads from the lower water chamber 8 to the water jacket. These two water chambers are connected by a plurality of tubes 11, 11, which are arranged in pairs, and are, preferably made of thin sheet like copper or similar material, with their upper and lower ends opening into the chambers 7 and 8, respectively. The tubes are formed by bending the same into an undulating or serpentine form, or in other words at regular intervals in substantially U-shaped form; the legs 12, 12 of each U and also the bases 13 thereof being arranged in a vertical plane and extending throughout the width of the casing 6, that is from the rear grate 14 thereof to the grate like cover 15 of the same. In uniting the tubes 11, 11 into pairs, their upper and lower ends 16 and 16′ are bent upwardly and downwardly, respectively. These ends are then cut away in a diametrical plane which is arranged parallel to the plane of the U-shaped bends or curves so as to obtain semicylindrical ends, which are united, for instance, by soldering so as to form a sleeve 17 with which both tubes of the pair communicate. Screw threaded nipples 18, 18 are fastened to the bottom 19 of the water chamber 7 and to the cover 20 of the chamber 8, and communicate with said chambers, respectively. The sleeves 17 of the pairs of tubes are connected with said nipples by means of sleeve nuts 20, 20.

In order to prevent the accidental disengagement of the sleeve nuts from the tubes and nipples, nut locks are provided, which consist of fork shaped members 21, 21 having jaws 22, 22 arranged on their prongs and in engagement with two parallel sides of the sleeve nuts. The forks are detachably secured by means of bent wires 23 to brackets 24, which are fastened to the tubes 11.

The cover 15 is provided in its lower edge with openings 25, 25 adapted to be engaged by the pins 26 upon the radiator casing, while the upper end of said cover is provided with slots 27, 27, adapted to be engaged by the resilient tongues 28, which are attached to the chamber 7 of the radiator.

It will be observed that the conduits have bends forming circuitous passages for the fluid to be cooled, and that their entire radiating surface is exposed to the air, and thus easily cooled. The tubes are arranged in

a plurality of vertical planes, are considerably longer and thus more effective than those heretofore in use, which are usually arranged in one vertical plane.

In order to replace a damaged pair of tubes 11, the nut locks are removed from the particular pair, the sleeve nuts loosened and the pair replaced without the aid of a skilled mechanic and without the usual soldering, etc.

What I claim is:—

1. In an apparatus of the class described, the combination with the inlet chamber, of an outlet chamber, and a plurality of tubes for the circulating fluid arranged in pairs connecting said two chambers and being bent into undulating or serpentine form, each pair of said tubes having a common inlet and a common outlet.

2. In an apparatus of the class described, the combination with the inlet chamber, of an outlet chamber, a plurality of tubes for the circulating fluid arranged in pairs connecting said two chambers and being bent into undulating or serpentine form, each pair of said tubes having a common inlet and a common outlet in the form of sleeves, and means engaging said sleeves for fastening detachably said tubes to said chambers.

3. In an apparatus of the class described, the combination with the inlet chamber, of an outlet chamber, and a plurality of tubes for the circulating fluid arranged in pairs connecting said two chambers and being bent into undulating or serpentine form, each pair of said tubes having its bent portions arranged in two parallel vertical planes and being provided with a common inlet and a common outlet.

4. In an apparatus of the class described, the combination with the inlet chamber, of an outlet chamber, a plurality of tubes for the circulating fluid arranged in pairs connecting said two chambers and being bent into undulating or serpentine form, each pair of said tubes having its bent portions arranged in two parallel vertical planes and being provided with a common inlet and a common outlet in the form of sleeves, and means engaging said sleeves for fastening detachably said tubes to said chambers.

5. In an apparatus of the class described, the combination with the inlet chamber, of a plurality of screw threaded nipples communicating therewith, an outlet chamber, screw threaded nipples in communication with said outlet chamber, a plurality of tubes for the circulating fluid arranged in pairs and bent into undulating or serpentine form, each pair of said tubes having a common inlet and a common outlet in the form of sleeves, and sleeve nuts engaging said sleeves and said nipples for fastening detachably said pairs of tubes to said chambers.

6. In an apparatus of the class described, the combination with the inlet chamber, of a plurality of screw threaded nipples communicating therewith, an outlet chamber, screw threaded nipples in communication with said outlet chamber, a plurality of tubes for the circulating fluid arranged in pairs and bent into undulating or serpentine form, each pair of said tubes having its bent portions arranged in two parallel vertical planes and being provided with a common inlet and a common outlet in the form of sleeves, and sleeve nuts engaging said sleeves and said nipples for fastening detachably said pairs of tubes to said chambers.

Signed at New York, in the county of New York and State of New York, this 12th day of September, A. D. 1910.

HERMANN KLEIN.

Witnesses:
WILLIAM REITER,
JULIUS J. VÖLGYI.