Nov. 18, 1930 H. A. HIGGINS 1,781,781

RADIATOR

Filed April 13, 1925

Fig. 1

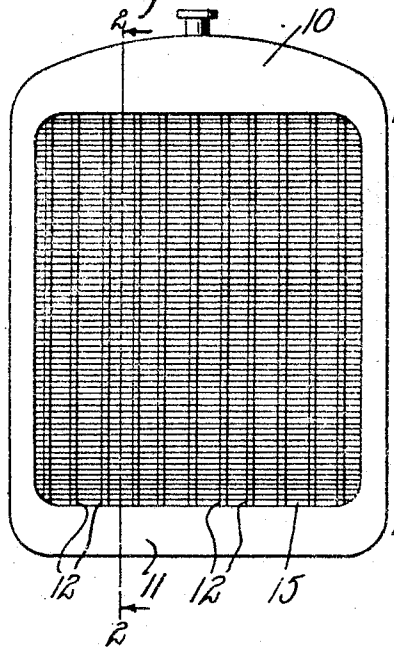


Fig. 2

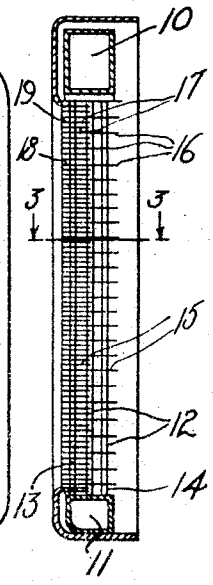
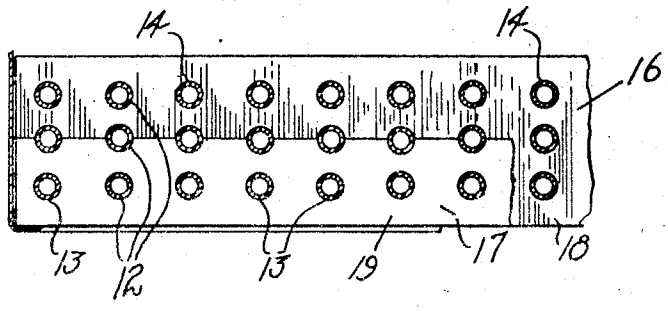


Fig. 3



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Patented Nov. 18, 1930

1,781,781

UNITED STATES PATENT OFFICE

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RADIATOR

Application filed April 13, 1925. Serial No. 22,857.

This invention relates to radiators and more particularly to tubular type radiators of a construction including water tubes and heat radiating or fin plates.

One of the objects of the invention is to provide a construction which may be cheaply manufactured by effecting a considerable saving in material without detracting from the appearance of the finished radiator nor lessening its efficiency in operation.

The invention further consists in the novel combination, construction, and arrangement of parts more fully hereinafter set forth in the accompanying specification especially when considered in connection with the drawings wherein

Figure 1 is a front elevation of a radiator constructed in accordance with my invention,

Figure 2 is a vertical sectional view taken substantially on the plane indicated by the line 2—2 in Figure 1, and

Figure 3 is an enlarged horizontal sectional view taken substantially on the plane indicated by the line 3—3 in Figure 2.

Referring now particularly to the drawings wherein like reference characters indicate like parts it will be noted that I have illustrated a radiator consisting of an upper tank or header 10 and a lower tank 11 adapted to be connected by a plurality of vertically arranged water tubes 12. These tubes may be arranged in any desired manner, the arrangement herein illustrated consisting of three rows of tubes, the forward row being indicated by the reference character 13 while the row to the rear is indicated by the reference character 14.

Associated with the vertical water tubes are a plurality of horizontally arranged relatively spaced heat dissipating or fin plates 15 which are each provided with a plurality of suitably spaced apertures for the reception of the vertical water tubes 12.

Efficiency in production from an economic standpoint depends upon the amount of material employed per inch in producing fin plates 15. However, while this efficiency might be obtained by a coarse or wide spacing of the fins still efficiency of operation and appearance limit the economy which can be thus properly exercised. In other words, the conditions prevailing during the operation of the radiator demand a sufficiency of heat radiating fins to properly dissipate the heat of the water flowing through the water tubes 12, while the demands made by appearance are that the front of the radiator be uniform, and custom dictates a relatively close spacing of the fin plates.

In order to contemplate all of the requirements for an efficient and otherwise commercially satisfactory radiator and to still obtain the desired production efficiency I provide a plurality of sets of fin plates 15, here shown as two, indicated by the reference characters 16 and 17, of relatively different widths. The set 16 of fin plates of the greatest width are sufficient to extend laterally of the radiator from a point adjacent the front of the forward row of tubes 13 to a point in back of the rear row of tubes 14, these plates, in the construction shown, being provided with three rows of apertures for accommodating the three longitudinal rows of water tubes 12. In other words the set of fin plates 16 corresponds in general to the shape and proportions of the fin plates ordinarily used in the vertical tube type of radiator.

In addition to the set of fin plates 16 there is provided the supplemental fin plates 17, here shown of a considerable lesser width and adapted to extend from a point in front of the forward row of tubes 13 to a longitudinal point rearwardly of the row of tubes 13, this point herein shown as in substantial alignment with the center row of tubes. The arrangement of the two sets of fin plates 16 and 17 is such that the forward edges 18 of the fin plates 16 are in vertical alignment with the forward edges 19 of fin plates 17 and constitute the forward or front face of the radiator. Furthermore the set of fin plates 17 is so arranged with reference to the set of fin plates 16 that an equal spacing and uniform appearance is obtained at the front of the radiator. Obviously the rear side of the radiator does not present such a uniform appearance but this is of no consequence inasmuch as the rear face of the ra-

diator is not visible when the radiator is assembled with the remaining parts of a motor vehicle or the like.

Obviously with an arrangement of fin plates such as herein described a great saving in the material of the fin plates is effected while the uniform and finished appearance of the radiator is preserved. In fact it is possible to practise a still closer spacing of the fin plates at the forward face of the radiator than that suggested in the drawings, thereby further improving the appearance of the radiator, and still effect a saving in material, since the set of fin plates 17 need only be extended to a point immediately behind the forward set of tubes 13, whereby more striking results as regards appearance are obtained, as well as the saving of material.

While in designing a radiator to be constructed in accordance with this invention due regard should be given to the heat dissipating requirements when determining the spacing of the set of fin plates 16; still it must be remembered that the set of fin plates 17 also contribute their part in dissipating the heat, particularly in view of the fact that they are adjacent the front of the radiator and in immediate or first contact with the air being drawn through the radiator by the fan, and due allowance for their contribution to the result should be made. Consequently no efficiency of operation is sacrificed but a great saving in material, and consequently in the cost of manufacture, is made possible.

With the above described construction it will be also readily apparent that the spacing of the water tubes 12 is maintained by the set of fin plates 16 so that a rigid construction is nevertheless possible. Furthermore while the set of fin plates 17 are herein illustrated as extending rearwardly to a point substantially in alignment with the center row of water tubes it should be understood that the depth of the supplemental set of fin plates may be varied as desired. In a like manner the relative number of fin plates in the sets 16 and 17 may be altered as found desirable or necessary, due regard, however, being given to the requirements of the radiator in operation.

Therefore while one specific embodiment of the invention has been herein illustrated and described in detail, reservation is made to make such changes in this construction as may come within the purview of the accompanying claims.

What I claim as my invention is:

1. In a radiator construction, a plurality of vertical water tubes, a plurality of horizontal spaced fin plates apertured for engagement with said tubes and extending from the front to the rear of the radiator, and a plurality of additional fin plates arranged between the first mentioned fin plates adjacent the front of the radiator, and extending only partially through the radiator, for the purpose set forth.

2. In an air cooled radiator having an air inlet side and an air outlet side, the combination of fins extending transversely of and entirely through the radiator and cooperating with the air passing therethrough to cool the radiator and additional fins adjacent the air inlet side of the radiator and extending only partially through the radiator to accelerate the cooling of the front portion of the radiator.

3. In a radiator construction, the combination with upper and lower headers and a plurality of water tubes arranged in rows three deep from the front to the rear of the radiator and connecting the upper and lower headers respectively, of a plurality of horizontal fin plates extending from the front to the rear of the radiator and engaging all of the said tubes, and a plurality of additional fin plates extending from the front of the radiator to a point midway between the front and the rear thereof, the said last mentioned fin plates terminating adjacent the middle row of water tubes.

In testimony whereof I affix my signature.

HARRY A. HIGGINS.