Feb. 8, 1944. V. R. ABRAMS 2,340,855

SUPPLEMENTARY RADIANT HEAT COOLING FINS

Filed Aug. 12, 1942

Fig. 1

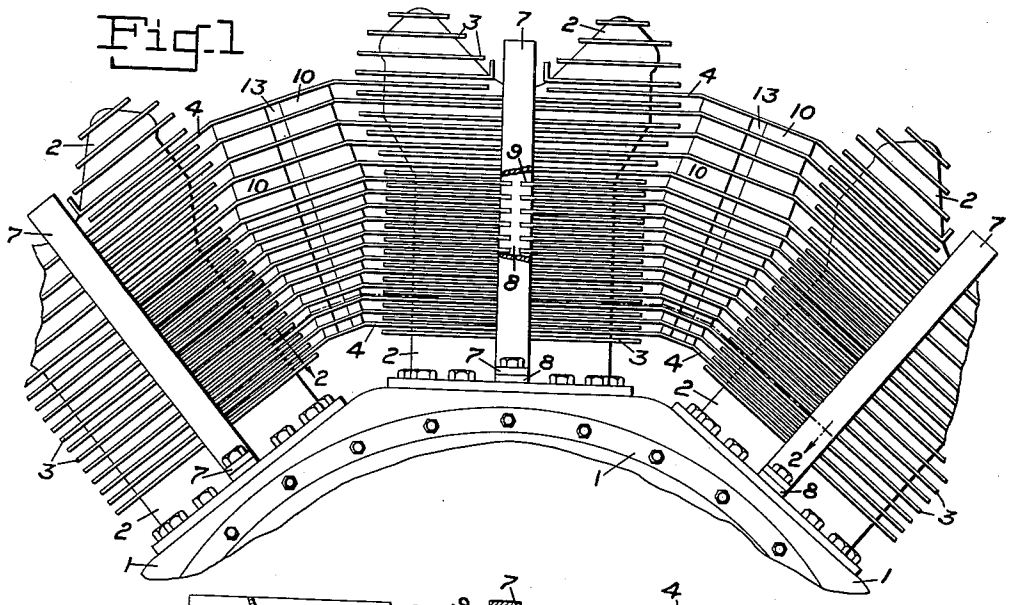


Fig. 2

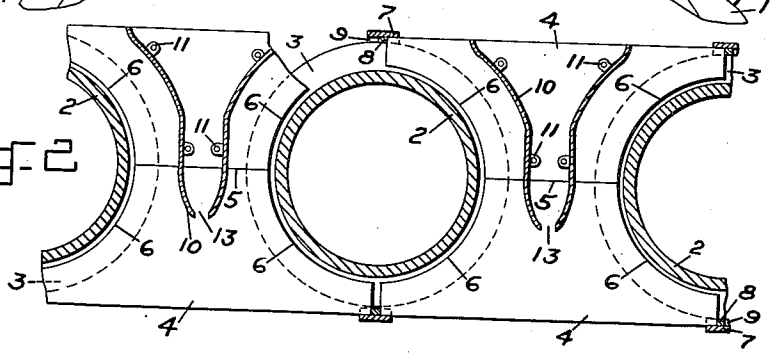


Fig. 3

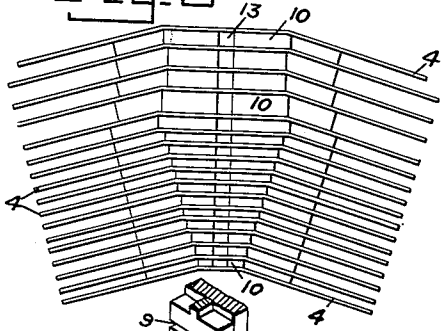


Fig. 4

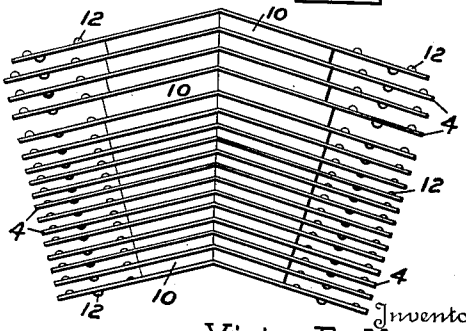
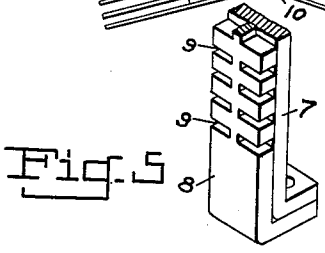


Fig. 5



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Patented Feb. 8, 1944

2,340,855

UNITED STATES PATENT OFFICE

2,340,855

SUPPLEMENTARY RADIANT HEAT COOLING FINS

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Application August 12, 1942, Serial No. 454,512

2 Claims. (Cl. 257—261)

(Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757)

The invention described herein may be manufactured and used by or for the Government for governmental purposes, without the payment to me of any royalty thereon.

This invention relates to air-cooling means and in particular pertains to a device for utilizing a greater degree of radiation combined with conduction by means of auxiliary conducting elements inserted between the vanes of conventional air-cooled bodies such as engine cylinders and the like.

It is therefore an object of the invention to provide means for a more rapid and efficient removal of heat from the air-cooled bodies. A further object is to provide for the more efficient heat removal from air-cooled bodies having cooling vanes by inserting a heat-conducting member between adjacent vanes. Still another object is to enlarge the effective radiation area from vaned, air-cooled bodies.

The specific nature of the invention as well as other objects and advantages thereof will clearly appear from a description of a preferred embodiment as shown in the accompanying drawing in which:

Fig. 1 is an elevational view of a portion of a radial engine with vaned cylinders.

Fig. 2 is a section taken on the line 2—2 of Fig. 1.

Fig. 3 is a view of an auxiliary vane unit as in Fig. 1 but separate from the motor assembly,

Fig. 4 is a view similar to Fig. 3 showing a modification, and

Fig. 5 is a detail of an auxiliary fin support.

Referring to the drawing by characters of reference there is shown a motor 1 having radial cylinders 2 with ribs or vanes 3 to increase the air-contacting surface, although it will be understood that the radial type is merely for purposes of illustration, and the invention may be practised with other types of engines such as V types and in-line cylinders. Extending into the recesses between vanes are metal sheets 4 comprising complementary parts meeting in the line 5 and having arcuate portions 6 conforming to the peripheries of the cylinders. The sheets 4 may be supported in any convenient manner so that the arcuate portions are maintained approximately midway between the cooling vanes 3. As shown this is accomplished by means of uprights fastened to the engine and comprising an outer member 7, and an inner member 8 slotted as at 9 to receive the edges of adjacent sheets 4. The supports shown may be omitted since the vanes can be self-sustaining both by reason of their configuration and by additional means such as dimples 12 struck in the vanes as shown in Fig. 4.

Support between sheets is afforded by straps 10 perpendicular to the sheets and fastened by riveted flanges 11 or other suitable means such as spot welding. Since baffles are usually desirable in the type of cooling the straps 10 are curved to accomplish this additional function of diverting the air to the rear of the cylinders. The baffles will preferably have a front opening 13 to allow cooling air to reach all parts of the vanes, but it will be understood that in some cases the baffles will be closed throughout their length.

It will be seen that whereas the usual ribbed type of body for cooling offers considerable advantage with respect to the increased surface which the cooling air may reach, this is purely a conduction effect. The radiation rate is not increased since the radiation area remains as the projected area of the cylinder wall, the same as if the ribs were not present. The sides of the ribs are merely "looking at each other" and the resultant of their radiation is very nearly zero. By reaching in with an auxiliary cooler vane radiant heat transfer is brought into play and contributes to the heat exchange, the radiated heat being carried off by conduction through the auxiliary fins which present a considerable surface to the air stream for dissipation of the heat, thus preventing that portion of the auxiliary fins between the cooling ribs from approaching the condition of radiant heat blockage which obtains in the conventional grooves without the auxiliary conducting member.

In addition to supplementary heat exchange by transfer of radiant energy a second cooling effect is introduced by the interposed auxiliary fins. This action depends on the cooling of the air mass by the auxiliary fin below the temperature to which it has been heated by the cylinder fin. This loss of heat maintains a greater temperature differential between the engine fin and the cooling air and hence promotes a greater heat exchange.

While an auxiliary vane has been shown extending into each trough, it may be expedient, where the ribs are closely bunched as they usually are in the straight portion of the cylinder, to place the vanes in alternate troughs. Thus each rib will have a radiation outlet, although only one side of any rib will in this case contribute to the heat transfer.

It will be understood that the particular form and extent of the auxiliary vanes shown and the manner of mounting are for illustrative purposes

and these details may be varied in considerable degree without departing from the spirit of the invention as defined in the appended claims.

I claim:

1. In an apparatus having cylinders with corrugations, auxiliary vanes between said cylinders and having end portions complementary in shape to the periphery of said cylinders and spaced therefrom, means on the apparatus to support said vanes, spacing straps secured to and between said vanes, said straps following the general wall curvature of the respectively adjacent cylinders and being spaced from said cylinders, whereby they serve as air-directing baffles.

2. An apparatus as in claim 1, the strap structure between adjacent cylinders having opposed openings in the air stream to permit flow of air therethrough.

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