Sept. 1, 1959 F. A. SCHICK ET AL 2,902,264

RADIATOR CORE FOR TRACTOR VEHICLES

Filed Oct. 24, 1957

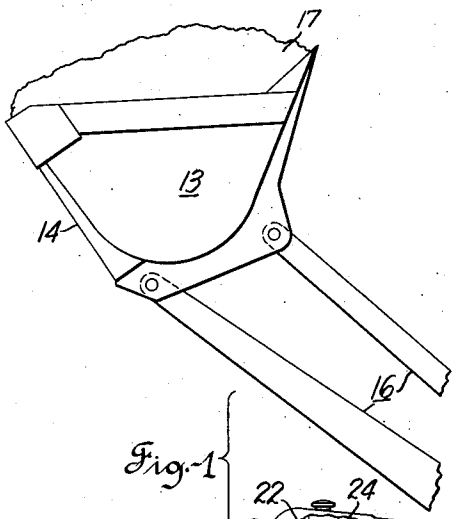


Fig. 1

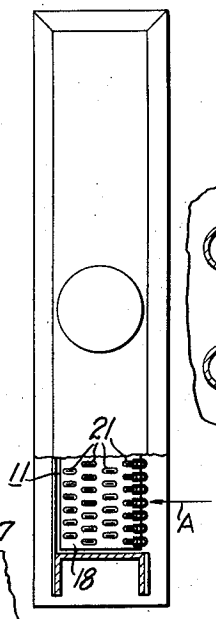


Fig. 2

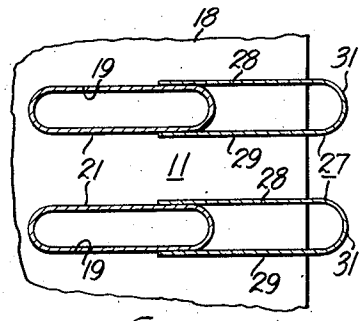
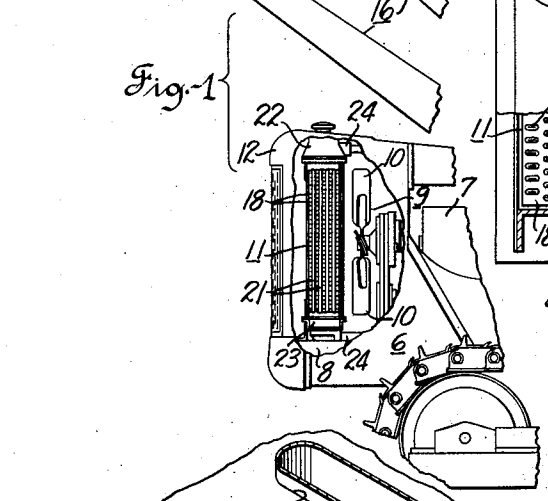


Fig. 3



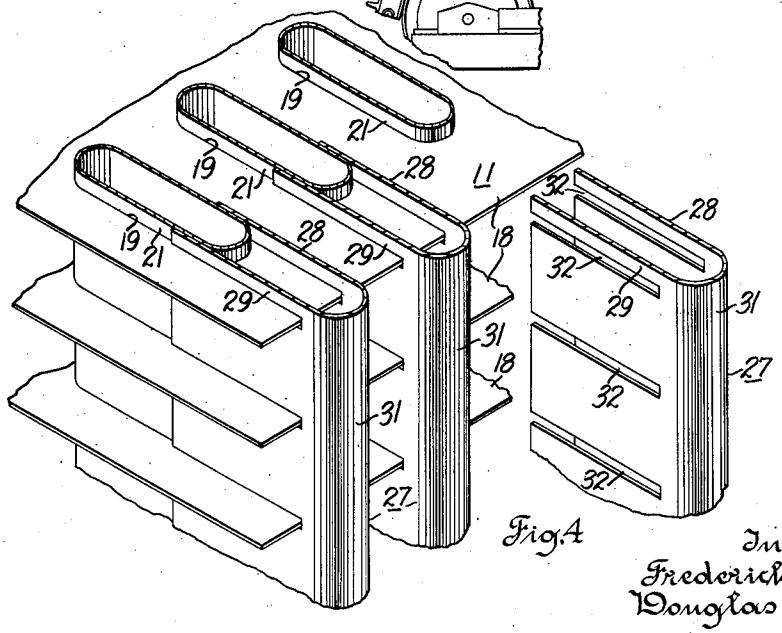


Fig. 4

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United States Patent Office 2,902,264 Patented Sept. 1, 1959

2,902,264

RADIATOR CORE FOR TRACTOR VEHICLES

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Application October 24, 1957, Serial No. 692,094

1 Claim. (Cl. 257—130)

This invention relates to a radiator core of the type to be installed in tractor type vehicles and is more particularly concerned with a protective means for guarding the tubing of such a radiator core.

Under certain conditions in which tractor type vehicles are required to work, the air which is circulated through the radiator core carries a considerable amount of abrasive material. The passing of the air stream containing this abrasive material over the tubes of the radiator core has a particularly damaging effect on the outside row of core tubes on the air receiving side of the core. This continuous sandblasting rapidly wears away the metal of the leading edge of the tubes causing the radiator to leak. In an installation equipped with a pusher type fan an additional difficulty is created because some of the larger particles of abrasive material, which are drawn into the air stream, strike the fan blading and are propelled at an extremely high velocity against the outside row of core tubes causing serious damage to the tubes, particularly to those already worn thin by sandblasting.

This problem is quite common in an application of a tractor vehicle equipped with a front end shovel loader attachment. During excavating and loading as the shovel is raised above the tractor, some of the material being excavated often spills out and is drawn into the air stream by the fan.

Heretofore several parts of protective screens for the radiator core have been suggested in order to sift out the abrasive particles. Such screens, however, which are of small enough mesh to prevent entry into the air stream of abrasive particles are so fine that they obstruct the normal flow of air to the radiator and hence reduce the cooling efficiency to a considerable extent. On the other hand screens which are of a large enough mesh to permit normal air flow through the core are not effective to sift out the coarser particles which are propelled by the fan blading against the outside row of tubes.

It is, therefore, an objective of the present invention to provide an improved radiator core which will take care of the deficiencies and difficulties hereinbefore described in an entirely satisfactory manner.

It is a more specific objective of the present invention to provide a protective means for the radiator core tubes on the air receiving side of the radiator core.

It is a further objective of this invention to provide a protective means for each of the radiator core tubes on the air receiving side of the core which is adapted to be used in combination with production type radiator cores.

It is a further objective of the present invention to provide a casing to be attached onto each of the tubes in the outside row on the air receiving side of the radiator core.

These and other objective and advantages of the present invention will become apparent when the following detailed description is read in conjunction with the appended drawings in which:

Fig. 1 shows the side view of the front portion of a crawler tractor of the type mounting a front end shovel loader attachment, a portion of the radiator guard being cut away to show a partial section through the radiator core and show the engine driven radiator fan;

Fig. 2 shows the top view of the radiator core of Fig. 1 having a portion cut away showing in section the core tubes including the outside row of tubes on the air receiving side of the radiator;

Fig. 3 shows an enlarged top sectional view of two tubes with protective means attached which are of the first row of tubes on the air receiving side of the radiator shown in Fig. 2; and

Fig. 4 shows an isometric projection of a section of the radiator core of Fig. 2 having one of the protective means disassembled from the core.

Referring to Fig. 1, for purposes of illustrating the invention a crawler tractor, which is indicated generally by the reference character **6**, has been selected which is of the conventional type. The crawler tractor **6** has an engine, indicated generally by reference character **7**, mounted on the forward portion of the main frame **8** (partially shown). An engine driven pusher type fan **9** which includes blading **10** is also of the conventional type and is mounted on the engine **7**. It is to be understood that the term pusher type fan as used herein is intended to describe that type of fan which is located next adjacent the air receiving side of the radiator core and pushes air through the core. It is not intended, however, to limit the invention to the type of fan installation. A radiator core **11** is fixedly mounted on main frame **8** by suitable means forwardly of and adjacent to the fan **9**, and a radiator guard **12** is mounted on the forward portion of the main frame **8** in protective relationship to the radiator core **11** and engine **7**. A conventional type front end shovel attachment indicated generally by the reference character **13** is pivotally mounted on the crawler tractor in a conventional manner. The shovel attachment **13** includes a bucket **14** which is pivotally mounted upon arms indicated generally by reference character **16**; and the arms **16** are pivotally mounted on tractor **6** in the conventional manner, the latter connection not being shown. The position of the shovel loader **13**, as shown, is the elevated position during a loading operation. The position of the shovel loader **13** illustrates a condition wherein some of the material **17** being conveyed by the bucket **14** is apt to spill and be drawn into the air stream of the fan.

Referring to Figs. 1 and 2, the radiator core **11** is of the type having a plurality of horizontally disposed, relatively spaced fins **18**, each being provided with a series of spaced transverse openings or apertures **19** which are in alignment with openings **19** in adjacent fins and are especially adapted to receive a series of vertically disposed fluid conducting core tubes **21** which extend transversely of the fins **18**. An upper manifold **22** and a lower manifold **23** are interconnected in fluid communication by the series of core tubes **21**. The upper manifold **22** has an inlet conduit means **24** connected to the pressure side of a conventional type water pump (not shown), and the lower manifold **23** has an outlet conduit means **24** connected to the suction side of the water pump.

Referring to Fig. 2, each of the core tubes **21** located in the outside row on the air receiving side of the radiator core **11** has attached thereto a protective means. Arrow A indicates the direction of air flow through the radiator core **11**. The side of the core **11** adjacent the arrow A is identical to the side of the core adjacent the fan **9** (in Fig. 1) and is referred to herein as the air receiving side.

Referring to Figs. 2, 3 and 4, the protective means comprise an elongated casing **27**, portions of which are best shown in Fig. 4, which has a U-shaped transverse

cross section. Casing **27** includes a pair of laterally spaced side portions **28**, **29** which are integrally connected by an end portion **31**. The side portions **28**, **29** are provided with a series of aligned longitudinally spaced transverse slots or openings **32**, shown best in Fig. 4, which are specially adapted to fit about the fins of the radiator core. The casing **27** in the installed condition extends longitudinally of and in overlapping relation to a core tube of the outside row of tubes and thus forms a protective shield about the leading edge of the tube. The side portions **28**, **29** can be fixedly connected on the sides of the tubes as by soldering. A well known method of producing a radiator core includes assembling the tubes and fins with solder material being applied in the areas where the tubes contact the fins and subsequently, as by induction heating, melting the solder. Capillary attraction causes the fluid solder to flow about the tubes where they are contacted by the fins, and thus when cooled the tubes will become intimately bonded to the fins **18** in the area of the apertures **19**. In the prior art processes for producing radiator cores, it will be readily seen that the casings **27** are adapted to be assembled on the outside row of core tubes **21** prior to the conventional soldering step so that the casings will be fixedly soldered on the core **11**. The solder thereby provides a means for fixedly interconnecting the tubes and fins as well as the side portions **28**, **29** of the casing and the corresponding sides of each tube. It is to be understood, however, that it is not intended to limit the invention to soldering, since other suitable means could be used to connect the casings on the radiator core.

It will be apparent from the foregoing detailed description that a novel protective means has been illustrated for protecting the first row of tubes on the air receiving side of the radiator core from excessive sandblasting and from damage due to impact of particles of foreign matter which are propelled at a high velocity by the fan blading. It will also be apparent that the

protective means which have been described are readily adaptable to be integrated into conventional type radiator cores.

Although one embodiment of the invention has been described in detail, this is not intended to limit the patent granted hereon otherwise than is necessitated by the scope of the appended claim.

What is claimed is:

A radiator core adapted for use in a tractor vehicle of the type having a pusher type fan, the combination comprising: an upper and lower manifold; a series of relatively spaced tubes interconnecting said manifolds, said tubes having an oblong cross section with the elongated sides thereof disposed parallel to the path of air flow; a plurality of relatively spaced fins extending transversely of said tubes; a protective means for each tube on the air receiving side of said core adjacent said fan, said means including an elongated casing having a generally U-shaped cross section, said casing having side portions extending around the leading edge of said tube adjacent said fan in overlapping abutting engagement with elongated side portions of said tube, the side portions of the casing having transverse openings extending from their trailing edges to fit about said fins, said casing also having an end portion extending longitudinally of said tube and projecting outwardly of said fins and said leading edge to form a protective shield about said leading edge and the portion of the tube side portions adjacent said edge; and bonding means for mutually securing said tubes, fins and protective means.

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