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(54) IMPROVEMENTS IN OR RELATING TO A HEAT EXCHANGER HEADER BOX MADE OF MOULDED SYNTHETIC PLASTICS MATERIAL

- (71) We, SOCIETE ANONYME DES USINES CHAUSSON, a company organised under the laws of France, of 35, rue Malakoff, Asnieres, Hauts de Seine, France, do hereby declare the invention for which we pray that a Patent may be granted to us and the method by which it is to be performed to be particularly described in and by the following statement: —
- 10 The present invention relates to a header box made of moulded synthetic plastics material for heat exchangers, particularly for cooling or heating radiators supplied by the cooling fluid of a heat engine.
- 15 More and more frequently, the heat exchangers of this type comprise header boxes made of moulded synthetic plastics material and these header boxes form, made directly by moulding, tubes for their connection to
- 20 flexible connecting pipes leading to the engine. Said tubes which are of large cross-section have a great strength and it is the same for the wall of the header boxes since this assembly forms a one piece unit.
- 25 In some cases which occur more and more often, one of the header boxes of the heat exchanger must also be connected to an expansion vessel or to an other accessory part of the circuit in which circulates the
- 30 fluid. The amounts of fluid driven to an expansion vessel are small and, consequently, there are designed tubular ends of a small diameter and typically about 1 cm. These tubular ends must however be long enough
- 35 to enable placing of a flexible pipe which must be suitably maintained, and it results therefrom that they substantially protrude beyond the wall of the header box of a distance which can be about 2 or 3 cms.
- 40 The rather great length of said tubular ends with respect to their cross section, make them fragile and they are particularly subject to be damaged during the various handlings to which the heat exchangers are
- 45 submitted before being positioned on ve-

hicles. Consequently, it frequently occurs that these tubular ends are broken, which prevents the heat exchanger to be used and requires the replacement of its header box. This replacement is often difficult to make 50 since most of the time it becomes necessary to disassemble crimped parts which hold the header box on the end plate of the heat exchanger.

The present invention has for its object 55 to provide a new header box which prevents any risk of accidental breaking of the tubular ends, and this without any disadvantage particularly with respect to the easiness of the connection of said tubular 60 end with a duct.

According to the invention, a header box made of moulded synthetic plastics material for a heat exchanger of the radiator type, said header box comprising a protruding 65 tubular end permitting connection to an expansion vessel or other accessory part of a circulation circuit, characterized in that said tubular end protrudes from a portion of the wall of the header box which portion 70 delimits a notch or a recess having a depth which is such that said tubular end does not protrude beyond planes delimited by the outer walls of said header box, whereby said outer walls form a protection for said 75 tubular end.

Various other features of the invention are shown in the following detailed description.

Embodiments of the present invention 80 are shown, by way of non-restrictive examples, in the accompanying drawings, in which:

Figure 1 is a diagrammatic elevation view of a portion of a cooling circuit of an 85 engine comprising a radiator connected to an expansion vessel;

Figure 2 is a partial elevation view of one of the header boxes made of moulded synthetic plastics material that the heat ex- 90

changer of Figure 1 is provided with;

Figure 3 is a cross-sectional view taken along line III-III of Figure 2;

Figure 4 is a partial elevation view showing a variant of embodiment of the header box made of moulded synthetic plastics material;

Figure 5 is a cross-sectional view taken along line V-V of Figure 4;

Figure 6 is a cross-sectional-elevation view of another variant.

In Figure 1, there is shown a cooling radiator 1 which comprises circulation tubes 2 separated by heat exchange elements in the form of corrugated fins 3. The tubes 2 are engaged in tube end plates 4, and said tube end plates are covered with header boxes 5. The header boxes are made of moulded synthetic plastics material and comprise various different accessory parts permitting connection of the radiator to the cooling circuit as well as for fixing the radiator to some frame supports. For example and as represented, the header boxes are provided with brackets 6, for fixing the radiator to frame supports, and with pipes 7.

The pipe 7 of the upper header box 5 is provided to be connected to the water outlet of the engine while the pipe 7 of the lower header box 5 is provided to be connected to the water inlet of the engine. In addition, at least one of the header boxes, for example the header box 5, comprises a tubular end 8 of a small size which is to be connected by means of a duct 9 to an expansion vessel 10.

Figures 2 and 3 illustrate at a greater scale than that of Figure 1 part of the header box 5 which comprises a peripheral flange 11 to be fixed to the corresponding tube end plate 4. At one end, the header box 5 is shaped to outsidely form a notch 12, whereby it innerly delimits, at the level of the notch 12, convergent duct 13 open at the tubular end 8. The tubular end 8 is formed from the wall 14 which delimits the notch 12 and, in this way, said tubular end is entirely contained in the space delimited by said notch 12 without protruding either with respect to the end wall 15 of the header box or with respect to the lateral wall 16 of this header box.

In this manner, the tubular end 8, while being perfectly accessible to permit placing the duct 9 leading to the expansion vessel 10 or to another accessory part of the cooling circuit, is substantially protected against the shocks which frequently occur upon handling of the radiator before positioning it onto a vehicle. Actually, this tubular end 8 being positioned in the notch 12, the end wall 15 and lateral wall 16 of the header box are the most subjected to shocks and of course said walls have a very great

strength with respect to the tubular end 8.

Figures 4 and 5 show a slight variant according to which the notch 12 is substituted by a recess 17 formed in the lateral wall 16, and the tubular end then designated by 8a protrudes from the bottom of said recess 17, which results in its complete protection on all its sides.

According to the variant of Figure 6, the header box 5 is shaped at one end or at its two ends, to form a notch 12a, and the tubular end, then designated by 8b, is formed in the notch 12a to protrude vertically as represented. In this manner, the end 8b, which is fully included inside the notch 12a, is protected by the lateral sides 18 of the header box, of which only one of said sides appears in the drawings since Figure 6 is a cross section.

The invention is not restricted to the embodiments shown and described in detail for various modifications thereof can be applied thereto without departing from the scope of the invention. For example, in the embodiment of Figure 6, it is possible that the notch 12 opens both towards the end of the header box and on a lateral side of the header box, in a similar way to the notch 12 of Fig. 3. This arrangement has the same advantages as that described in the above disclosure and, especially, the access to the tubular end 8b is as easy as in the embodiment shown in Figure 3.

WHAT WE CLAIM IS:—

1. A header box made of moulded synthetic plastics material for a heat exchanger of the radiator type, said header box comprising a protruding tubular end permitting connection to an expansion vessel or other accessory part of a circulation circuit, characterized in that said tubular end protrudes from a portion of the wall of the header box which portion delimits a notch or a recess having a depth which is such that said tubular end does not protrude beyond planes delimited by the outer walls of said header box, whereby said outer walls form a protection for said tubular end.

2. Header box as set forth in claim 1, characterized in that the tubular end is placed near one end of the header box and protrudes from a portion of wall delimiting a notch.

3. Header box as set forth in either claim 1 or 2, characterized in that the tubular end protrudes from the bottom of a deep recess formed in the wall of the header box.

4. Header box as set forth in any one of claims 1 to 3, characterized in that the recess is formed from one of the lateral walls of said header box.

5. Header box as set forth in any one of claims 1 to 4, characterized in that the recess is formed from one of the end walls of the header box.

6. Header box as set forth in any one of claims 1 to 5, characterized in that the recess is formed from one of the end walls of the header box and has the shape of a notch opening in one of the small sides or in one of the large sides of the header box.

7. Header box as set forth in any one of claims 1 to 6, characterized in that the recess is formed in one of the end walls of the header box, the tubular end protruding vertically from the bottom of said recess while considering the base of the header

box is placed horizontally.

8. Header box made of moulded synthetic plastics material for a heat exchanger of the radiator type, substantially as hereinbefore described and illustrated in the accompanying drawings.

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