Feb. 20, 1968 E. S. NELSON 3,369,595

FIN TUBE UNIT WITH PROTECTIVE CORNER PLASTIC RAILS

Filed March 31, 1966

FIG. 1

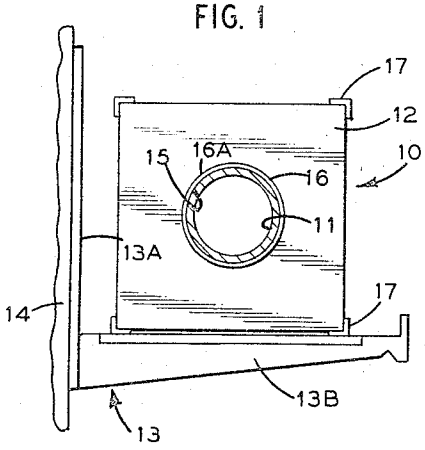


FIG. 2

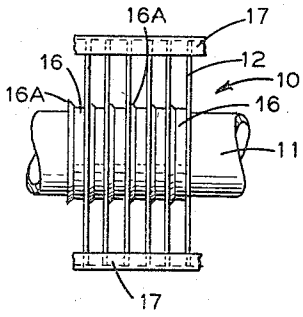


FIG. 3

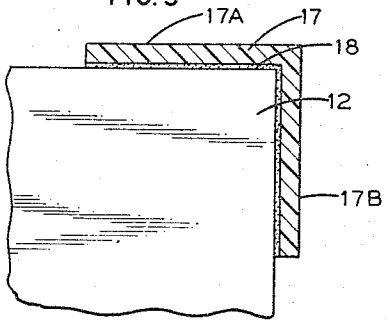
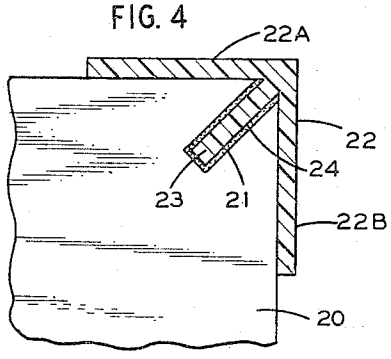


FIG. 4



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FIN TUBE UNIT WITH PROTECTIVE CORNER PLASTIC RAILS

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1 Claim. (Cl. 165—55)

ABSTRACT OF THE DISCLOSURE

This invention relates to a fin tube unit which comprises an elongated tube having a plurality of fins secured to the tube at spaced relationships longitudinally of the tube. Each fin is arranged so that its respective corner portions are disposed in alignment and a track of plastic material is provided to define a protective cover for the respective aligned corner portions of the fins. The respective tracks comprise angular members having angularly disposed leg portions defining therebetween an angle complementing the angle of the respective corners of the fins with means for adhesively securing the track to the corner portions of the fins.

This invention relates in general to a fin tube unit of a type which may be readily adapted for heating and/or cooling applications, but more commonly in baseboard radiation type heating installations.

This invention specifically is directed to an improved fin tube unit and protective track therefor of a kind disclosed in U.S. Patent No. 2,963,276.

Heretofore, and before the invention covered in U.S. Patent 2,963,276, considerable difficulties had been encountered in the installation of fin tube units, such as employed for baseboard radiation applications due to the expansion and contraction thereof and of noise resulting therefrom. The difficulties encountered were more aggravated in relatively long units in which a plurality of fin tube segments were required to be joined together.

Generally, each unit segment is comprised of an elongated tube of predetermined length on which a plurality of radiating fins were secured in longitudinally spaced relationship therealong. Support for such units was accomplished by simply resting the same on suitable support brackets spaced along the length thereof. Consequently, such units were supported with the metallic fin by resting in direct contact onto an arm portion of the bracket, which was also formed of metal. Consequently, during expansion and contraction of the fin tube unit, when placed in operation, resulted in a considerable amount of friction between the fin tube unit and the brackets on which the same was supported. As the fin tube unit and the brackets were formed of metallic material, the friction resulting therebetween due to the expansion and contraction of the fin tube unit resulted in a considerable amount of noise. Also, the expansion and contraction of the tube element relative to the fins connected there frequently caused some of the fins to loosen. When this occurred, the loosened fins would also create a further noise problem. The relative movement between the fin tube unit and the bracket supports further tended to damage or otherwise bend the marginal portions of the fins and thereby adversely affect the efficiency and/or heat transfer characteristics thereof. Consequently, relatively expensive and complicated bracket constructions had been heretofore conceived in an effort to minimize the problems due to expansion and contraction of such fin tube units, and of the noise resulting therefrom. Also, the known relatively complicated supports not only increased the initial cost of such installations, but it also

resulted in increasing the time, effort and cost of installing such units.

To obviate these difficulties, efforts have been made to provide the corner portions of the fins in such units with a protective track to prohibit rattle between individual fins spaced along the tube, and for protecting the fin tube unit from damage due to relative movement between the fin tube unit and its support brackets due to expansion and contraction thereof when placed in operation. Such efforts, as set forth in Patent No. 2,963,276, utilized specially constructed fins and track means to accomplish the portions of the fins and at the same time tie the fins in a desired result whereby the problems noted were obviated.

It is therefore an object of this invention to further simplify the fin tube unit and track therefor whereby resulting noise due to expansion and contraction is minimized.

It is another object of this invention to provide a fin tube unit in which the track is secured to the aligned corner portions of the fins in a relatively simple, expedient, economic and positive manner.

It is another object of this invention to provide a fin tube unit in which the corner portions of the respective fins are protected and tied together in a relatively simple and expedient manner.

It is another object of this invention to provide a fin tube construction having an improved track construction which extends along the respective fins to form a continuous protective covering for the respective corner portions thereof in which the track element is shaped to complement the shape of the fin corners so that the track can be readily secured to the respective fins by adhesive bonding.

It is another object of this invention to adhesively secure a deformable track to the corner portions of the fins by a suitable adhesive bond.

In accordance with this invention, the foregoing objects and other features and advantages are attained by a fin tube unit comprising an elongated tube having longitudinally spaced therealong a plurality of similarly constructed fins. More specifically, the fins are formed as regular shaped members in which the respective corner portions thereof are defined by adjacent edges disposed at fixed angles relative to each other. In accordance with this invention, an elongated track member formed of a flexible, and preferably non-metallic material is adhesively secured to the aligned corner portions of the respective fins.

In one form of the invention, the track comprises a member formed of a plastic strip having a pair of angularly disposed leg portions to define therebetween an angle complementing the fixed angle defined by the corner portions of the respective fins. The arrangement is such that the deformable strip or track is positioned with respect to the aligned corner portions of the fins so that the leg portions of the track embrace the adjacent edge portion of the fins at the corners. A suitable adhesive material or bonding agent is utilized to positively and adhesively secure the track to the corner portions of the respective fins of the fin tube unit.

In another form of the invention, the fin is provided with an inwardly and diagonally extending slot formed in each of the respective corner portions. Accordingly, the track is formed with an intermediate web portion adapted to be received in the notch in the respective corners of the fin. In this form of the invention, the adhesive bonding means or agent is utilized to secure the opposed surfaces of the web to the side edges of the slot in the corner portions of the respective fins of the fin tube unit.

A feature of this invention resides in the provision of

a fin tube unit in whic the deformable track is utilized as being adhesively secured to the respective fins.

Another feature of this invention resides in the relative simplicity in which the deformable track is secured to the respective fins of the fin tube unit.

Other features and advantages will become more readily apparent when considered in view of the specification and drawings in which,

FIGURE 1 is an end view of the improved fin tube unit and support therefor as constructed in accordance with the present invention.

FIGURE 2 is a fragmentary side elevation view of a fin tube unit of FIG. 1.

FIGURE 3 is an enlarged fragmentary corner portion of the fin and track construction to illustrate the connection of the track to the corner portion of the fin.

FIGURE 4 is an enlarged fragmentary view of a modified corner and track assembly.

Referring to the drawings, there is shown in FIGS. 1 and 2 a fin tube unit **10** constructed in accordance with the present invention. As shown, the fin tube unit **10** is of a type which is readily adapted for use as a baseboard heating unit. However, it will be understood that the fin tube unit may be readily adapted for other uses, e.g. cooling.

The fin tube unit **10** comprises a radiating section that includes a tube **11** of predetermined length having a plurality of fins **12** secured thereto at longitudinally spaced relationships therealong. In the illustrated embodiment, the fins **12** are shown as being substantially rectangular in shape.

The support for the fin tube unit **10** comprises generally of a bracket or element **13** which is spaced at regular intervals along a suitable supporting surface **14** such as a wall or the like. The brackets or supports **13** comprise essentially of a suitable backing member **13A** by which it is secured to a wall **14**, and which back member **13A** has connected thereto a laterally extending arm portion **13B** to form the base or support on which the fin tube unit **10** rests. A plurality of such supports or bracket members **13** are longitudinally spaced along a suitable wall **14** to provide the necessary means for supporting an elongated fin tube unit.

The respective fins **12** as illustrated are substantially rectangular in shape, and each is provided with a central opening **15** through which the tube length **11** is extended. As best seen in FIG. 2 a collar **16** circumscribes the central opening **15** of the fin. This collar **16** is formed so that the free end **16A** thereof is flared outwardly to permit the collar **16** to function as a stop or spacer against which the next adjacent fin **12** abuts. The collar **16** thus defines the means by which the spacing between adjacent fins **12** is maintained.

Referring to FIGS. 1 and 3, it is to be noted that each of the respective corner portions of the fins **12** defines an angle formed by the adjacent sides. The corner angle of the fins illustrated is substantially 90°. As shown in FIGS. 1 and 3, the fin construction comprises simply of a plane rectangular blank which is formed by a simple stamping and/or drawing operation from blank of material.

In accordance with this invention, a track **17** comprising an elongated member is extended along the respective corner portions of the fins **12** spaced along the tube length **11** to provide a protective cover therefor. Also, the track **17** functions as a buffer or contact between the fin tube unit **10** and its supporting bracket **13B** as best seen in FIG. 1.

The track member **17** is preferably formed of any suitable flexible, and preferably non-metallic material, as for example a plastic strip or the like. In the illustrated form of the embodiment of FIGS. 1 and 2, the track member **17** is formed as an angular member in which the respective leg portions **17A**, **17B** thereof are disposed at an angle shaped to complement the angle defined by the adjacent marginal edges of the fin **12** to which the track is fitted.

In the illustrated form of the invention of FIG. 3, it will be noted that the leg portions **17A**, **17B** of the track member **17** are disposed at substantially 90° with respect to one another. Also, it is to be noted that the respective leg portions **17A**, **17B** of the track member comprise a relatively flat surface which abuts against the adjacent marginal edge portions of the fin **12** at the corner thereof. The arrangement is such that in the assembled position, the leg portions **17A**, **17B** of the angle strip or track **17** is flush against the respective edge portions of the fins **12**.

To effect a positive bond or connection between the track **17** and the respective fins **12**, a suitable adhesive as for example, an epoxy type binder or cement **18** is employed. Accordingly, the epoxy binder, cement or adhesive **18** is applied to either or both the corner portions of the fin **12** or to the inner surfaces of the plastic strip **17** so that when the strip is applied to the corner portions of the fin and upon the setting of the epoxy or adhesive, there is created a permanent bond between the track and the corner portions of the respective fins. Thus, a relatively simple and positive connection is established between the plastic track **17** and the fins **12**. With the construction described, it will be noted that a relatively simple fin construction can be utilized in conjunction with a relatively simple track construction. Further, the attachment of the track **17** to the fins **12** is accomplished in a relatively simple manner. Once the epoxy or adhesive has set, the plastic strip or track **17** is positively secured to the corners of the fins. With the plastic strip or track **17** secured to the fins, the fin tube unit **10** when supported on the brackets **13** will actually rest on the leg portions of the plastic track which lie against the bottom edges of the fins **12**. Thus, a complete absence of metal-to-metal contact is provided between the fin tube unit and the brackets supporting the same. As a result, a minimum of noise results during the expansion and contraction of the fin tube during operation.

Because the track further protects the corners of the fins, the track **17** prohibits the fins **12** from becoming bent or distorted. Also, the track **17** will function to further silence or dampen any sound or noise which would otherwise result from relative movement between the fins and tube in the event the expansion or contraction causes any of the fins to loosen.

FIGURE 4 illustrates a modified form of the invention. In this form of the invention, the fin construction **20** is substantially similar to that hereinbefore described with the exception that the corner portions of the fin is provided with a slot **21** which extends inwardly and diagonally of the fin. The track member **22** adapted to be secured to the fin construction **20** of FIG. 4, is similar to that described with respect to FIG. 3 with the exception that a longitudinally extending web **23** is integrally formed intermediate the leg portions **22A**, **22B** of the track member **22**. The web **23** thus bisects the angle defined by the respective leg portions **22A**, **22B** of the track **22**. The width of the web is made slightly less than the width of the slot **21** defined in the corner portion of the fin so that the web **23** in the assembled position of the track is readily fitted into the slot of the fin. To effect a permanent bond between the track **22** and each of the respective fins of the modified embodiment, a suitable adhesive or epoxy binder **24** is utilized to effect a bond between the web and the adjacent edges of the slot **21**. Thus, the setting of the bond or epoxy will create a permanent attachment between the track **22** and the fin **20**.

In the form of the invention shown in FIG. 4, the adhesive or epoxy material **24** is applied to the web **23** of the track only. However, it will be readily understood that, if desired, that the undersurface of the respective leg members **22A**, **22B** of the track may be also coated with an epoxy or adhesive material so that the respective leg por-

tions may also be bonded to the adjacent edge portions of the fin in the manner described with respect to FIGS. 1 and 3.

In all other respects, the modification of FIG. 4 is similar to that of FIG. 3.

From the foregoing, it will be apparent that the application of the track member **17** or **22** to the respective corner portions of the fins **12** or **20** is relatively simple, expedient, and positive. Once the bond material has set, it will function to create a permanent attachment between the track and the respective fins.

While the instant invention has been described with reference to several embodiments thereof, it will be readily appreciated and understood that variations and modifications of the invention may be made without departing from the spirit or scope thereof.

What is claimed is:

1. A fin tube unit comprising,
an elongated tube,
a plurality of fins secured to said tube at predetermined spaced intervals longitudinally of said tube comprising,
each of said fins having its respective corner portions disposed in alignment along said tube,
a track defining a cover for the respective aligned corner portions of said fins,
said track having angularly disposed leg portions defining therebetween an angle complementing the angle defined by the respective corners of said fins,

the aligned corner portions of said fins having an inwardly extending slot formed therein,
and said track including a web extending longitudinally thereof, said web being disposed between the angularly disposed leg portions of said track whereby said web is received in the slots when said track is positioned on said fins,
and means for adhesively securing said track to the fins whereby the respective leg portions of said track overlie the edges of said fins to form a protective covering therefor, said means for adhesively securing said track to said fins is disposed between the web portion thereof and the edges of the slot in said fins.

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