March 17, 1970 A. H. McELROY 3,500,903

HEAT EXCHANGE ARTICLE

Filed March 29, 1968

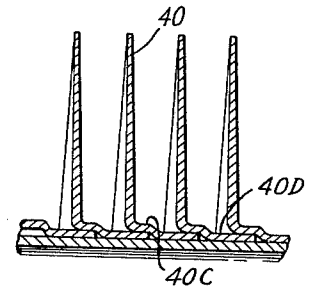
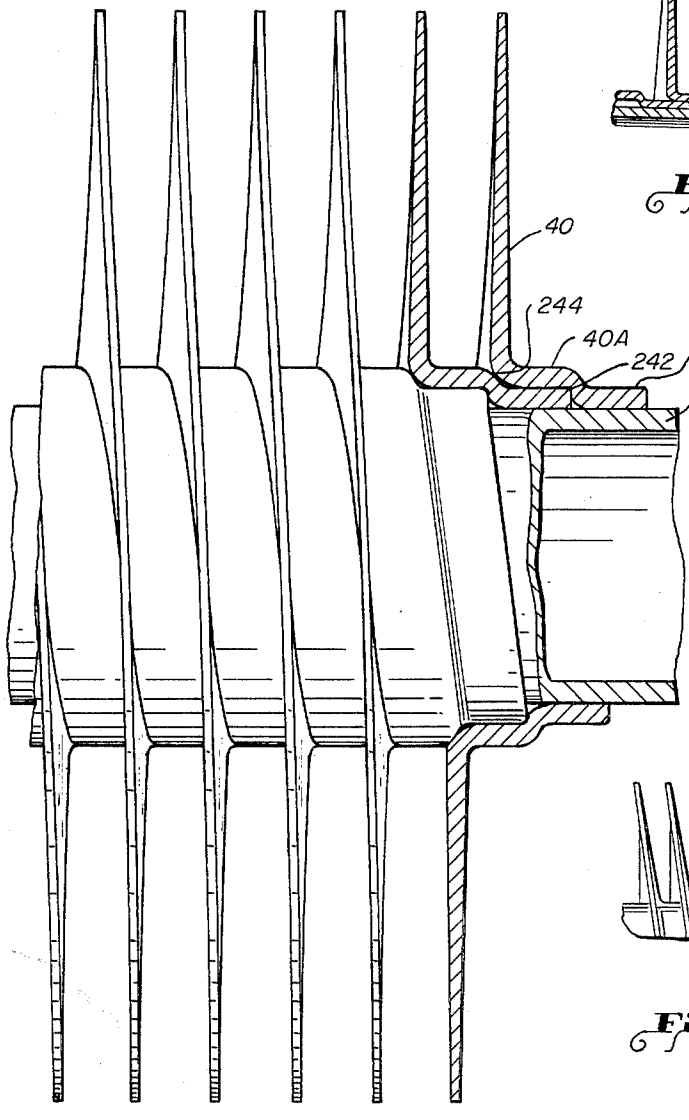


Fig. 1C.



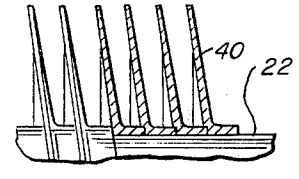


Fig. 1B.

Fig. 1.

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HEAT EXCHANGE ARTICLE

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Continuation-in-part of application Ser. No. 487,857, Sept. 16, 1965. This application Mar. 29, 1968, Ser. No. 717,228

Int. Cl. F28f *1/14;* B21d *53/00*

U.S. Cl. 165—184 3 Claims

ABSTRACT OF THE DISCLOSURE

A helically wound finned tubing used in heat exchange processes includes a double bent foot portion of the fin stock in which said foot portions overlap to provide efficient heat transfer surfaces.

CROSS-REFERENCE TO RELATED APPLICATION

This application is a continuation-in-part of application of Ser. No. 487,857 filed Sept. 16, 1965 now Patent No. 3,388,449 issued June 18, 1968.

BACKGROUND OF THE INVENTION

There are many apparatus and methods of producing helically wound finned tubing known in the prior art. Invariably, however, the resultant fin stock includes areas where the fint material is not in good heat transfer relationship with the tubing or with the next adjacent fin.

This invention has for its object to provide an improved finned tubing stock which is of increased heat transfer ability over that presently available, and which provides improved inter-engagement of the fin with the tubing and the next adjacent fin so as to form a substantially unitary heat transfer surface.

SUMMARY

This invention relates to an improved finned tube having improved means for securing the fin to the tube surface for increased heat transfer in surface contact. Finned tubing of the type described herein generally comprises a metallic bare tube upon the external surface of which is secured a continuous thin ribbon-like metallic fin in the form of a helix. Finned tubing of this nature is extensively used in the manufacture of heat exchangers.

It is an object of this invention to provide a finned heat transfer tubing wherein a substantially L-shaped fin stock extends helically around said tubing, and wherein the horizontal foot portion overlaps a portion of the previously formed foot and is substantially extruded and deformed thereon under sufficient pressures to be substantially integral and hence provide more efficient heat transferring surface for heat exchangers and the like.

These and other objects of this invention will become apparent upon further reading of the specification and claims when taken in conjunction with the drawings submitted herewith.

BRIEF DESCRIPTION OF THE DRAWING

FIGURE 1 is a partial sectional view of finned tubing formed as a result of the methods and apparatus of this invention.

FIGURE 1B is a partial sectional view of the embodiment incorporated herein from my copending application Ser. No. 487,857.

FIGURE 1C is a partial sectional view of an additional embodiment of this invention showing a finned tube design wherein the horizontal feet of the fin stock are of unequal lengths.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

FIGURE 1 represents a cross section of the substantially desired helically wound fin tubing produced by the apparatus herein described. As such, fin material **40** includes an outwardly tapered and radial vertical portion and a double bent substantial horizontal portion. This horizontal foot portion is preformed to define a first portion **40A**, adjacent the vertical leg, and a second portion **40B** offset outwardly from the first portion and substantially parallel thereto. When the defined fin is wrapped securely about the tubing **22** it provides for a substantial overlap arrangement such that inter-engagement of the overlapping fin at the points designated **242** and **244** substantially creates an integrally wound finned tubing for more efficient heat transfer between the fluid materials passing within the tubing **22** and the fluid to which the fins **40** are exposed. In FIGURE 1B fin **40** is L-shaped to include the vertical inward-outward tapered leg and a horizontal foot. The foot portion in this embodiment is not preformed as in FIGURE 1, but is, upon being applied to tubing **22**, caused to forceably overlap the outer edge of the foot of the previously helically wound fin so as to integrally engage and deform therewith and as more aptly described in the aforesaid copending application.

In FIGURE 1C the horizontal foot portions are of unequal length. For example, first portion **40C**, adjacent the vertical leg is shorter in length than second portion **40D** which is offset outwardly of the first portion and substantially parallel thereto.

What is claimed:

1. A heat transfer article of manufacture comprising: tubing; and

a substantially continuous fin helically wound on said tubing, said fin of L-shape cross section having a horizontal foot and an outwardly-inwardly tapering vertical leg, said horizontal foot defined by first and second substantially parallel offset portions, said first portion being adjacent said vertical leg and upward of said second portion,

said fin material deformed under pressure on said tubing such that said second portion tightly engages the outer periphery of said tubing and said first portion overlappingly engages the second portion of the previously formed fin to form a mechanical seal therewith coextensively with the peripheral extent of said tubing so as to protect said tubing from corrosive environmental fluids contacting said fins and to provide a substantially unitary heat transfer surface with said tubing.

2. An article according to claim **1** wherein said first and second portions of said horizontal foot are of substantially equal length.

3. An article according to claim **1** wherein said first and second portions of said horizontal foot are of unequal lengths.

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29—157.3