

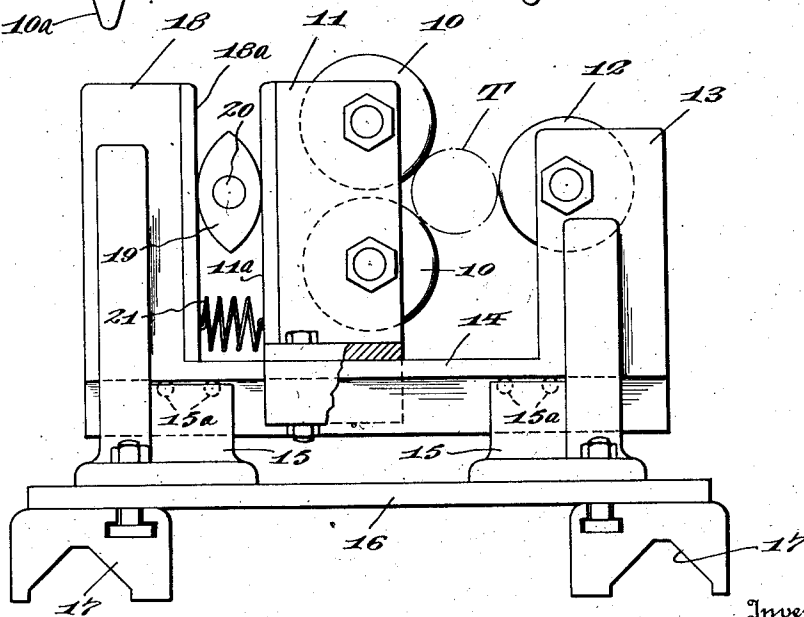
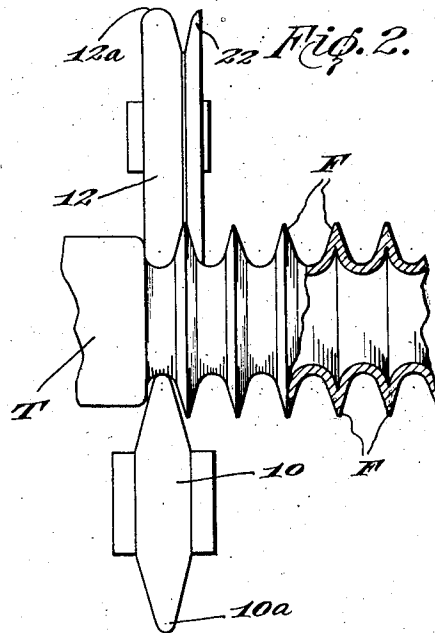
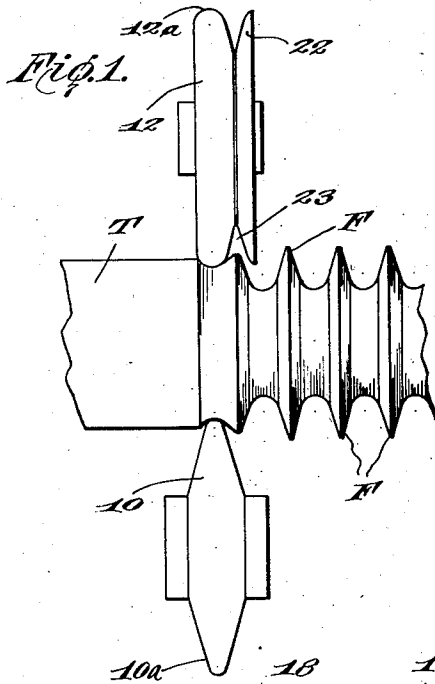
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METHOD OF MAKING RADIATOR ELEMENTS

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METHOD OF MAKING RADIATOR ELEMENTS

Application filed April 19, 1930. Serial No. 445,738.

This invention relates to the manufacture of radiators, and more particularly to a new and improved method for producing tubular heat transfer elements of radiators equipped with transverse radial fins spaced apart along the length of the tubular radiator structure. My improved method consists in subjecting tubular stock, which may be initially a plain tube of suitable ductile metal such as aluminum, copper, or the like, to the action of co-operative rolls which, acting radially and oppositely upon the tube externally thereof, produce the requisite spaced apart radiating fin formations thereon by a rolling and spinning operation which has the effect of condensing and strengthening the metal and making the rolled or spun fins particularly strong and resistant to pressures and strains. In accordance with the method of my invention, no form or guide interior of the tube is required but all of the operative action to which the tube is subjected is applied exteriorly thereof. The distinctive features and advantages of the invention will be better understood from the following detailed description taken in connection with the accompanying drawing and the features of novelty will be thereafter pointed out in the appended claim.

Referring to the drawing, Figure 1 is a diagrammatic fragmentary elevation showing the initial portion of the rolling or spinning operation as carried out by the rolls upon the tube in accordance with my invention. Figure 2 is a similar view illustrating the completion of the rolling operation upon a portion of the tube by which a fin and adjacent valley on the tube is completed, and Figure 3 is a partial end view with portions broken away and in section illustrating the movements of the rolls which act upon the tube. T indicates a portion of tubular stock which is provided of the requisite diameter and length in accordance with the dimension of the radiator element to be produced. 10—10 indicate a pair of rolls which may be designated spreading rolls mounted in vertical spaced apart relation on a column or post 11. 12 indicates a roll which may be designated a shaping roll mounted opposite the median line of the pair of rolls 10—10 to co-operate therewith, on a column or post 13. This column 13 has a horizontal extension 14, which is slidably fitted on rests 15—15, as shown with interposed antifriction rollers 15a. The rests 15 are shown as fixed in spaced apart relation upon a base plate 16, which constitutes a portion of a carriage adapted to slide on ways of a usual or suitable lathe having for this purpose bearing blocks 17 to fit the ways of such lathe. The horizontal extension 14 bears at its end opposite the column 13 another column or post 18 equipped with an inner face 18a which is engaged by a cam 19 mounted on a suitable operating shaft 20. This cam also engages a face 11a on the column 11 so that the action of such cam is adapted to press the pair of rolls 10—10 and the roll 12 towards each other and against the tubular stock T which is suitably mounted on the lathe centers in operative relation between said rolls. A tension coil spring 21 is fitted to co-act between the faces 11a, 18a tending to move the columns 11, 18 so as to separate the roll 12 from the pair of rolls 10—10. It is to be noted that the spreading rolls 10 are formed with a blunt V-shaped periphery while the shaping roll 12 has a thicker rounded periphery 12a and has associated therewith at the side thereof a secondary roll formation 22 which may be designated as a guiding roll. The function of the spreading rolls 10 with their relatively narrower operative edges is to effect a preliminary indentation of the metal in a narrower area, thus preparing the way for the action of the wider shaping roll which determines the finished contour of the finned tube. The rolls 10, 12 thus co-operate to effect a spinning action upon the metal in a manner that is particularly effective for the designed purpose. Between the shaping roll 12 and the guiding roll 22 is an abrupt and relatively deep V-shaped valley 23 which serves to determine the shape and contour of the fins F which are produced by the rolling operation upon the tube. It will be thus understood that the depth and contour char-

acter of the fins F may be varied at will by a selection of rolls 10 and 12—22 according to the requirements of the work in hand, and in connection with a selectively variable inward or feed movement of the rolls upon the tube as effected by cam 19 which may also be selectively changed in contour according to the requirements of the particular work.

It will be understood that in practice the carriage structure 16—17 is held stationary on the lathe bed while the rolls are performing the operation as described of producing each single fin and adjacent valley upon the tube, and that between such operations the cam shaft 20 is operated by suitable mechanism to permit retraction of the rolls away from the tube at which time the roll bearing carriage by suitable mechanism is moved along the lathe ways a distance just sufficient to position the rolls for producing the next fin on the tube, and that this sequence of operations may be continued indefinitely to produce any required length of tubular radiator product in accordance with my invention. It is to be noted that the described operation results in increasing the length and diameter of the product as compared with the original tube and in changing the form thereof to create fins of any required shape or diameter, and to provide fluid chambers extending outward into the bases of the fins as seen in Figure 2.

An important advantage of the invention is that no form or guide within the tube is required in order to produce the finished product. It will be understood that while I show only one set of co-operative rolls acting upon the tube, that any desired number thereof may be arranged in multiple to act upon the tubing simultaneously, so that a number of fins may be produced at once by each feeding movement of the rolls, instead of a single fin as herein shown. The described invention may be readily carried out on an ordinary lathe, or any suitable machine of a general lathe type, the essential features being the described co-operative action of three or more rolls arranged as described to work towards the lathe center. The described operation results in materially condensing and strengthening the metal of the tube in producing the described fins by the rolling or spinning operation thereon as set forth.

I am aware that the invention may be embodied in other specific forms without departing from the spirit or essential attributes thereof and I therefore desire the present embodiment to be considered in all respects as illustrative and not restrictive, reference being had to the appended claim rather than to the foregoing description to indicate the scope of the invention.

Having now described my invention, what

I claim as new and desire to secure by Letters Patent is:

The method of spinning tubes to produce tubular finned elements which comprises rotating said tube, and feeding spinning elements into operating engagement therewith with operative portions of said elements adapted to engage the metal of the tube in a relatively narrower area at one side thereof and in a wider area producing the finished contour of the tubular finned element at another side thereof.

In witness whereof I have affixed my name to this specification.

FRANK K. HOFFMAN.