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H. A. STAPLES

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METHOD FOR MANUFACTURING TUBES WITH ENLARGED ENDS

Filed June 9, 1926

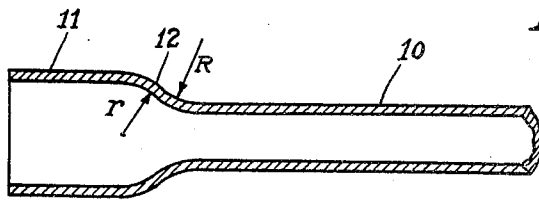


Fig. 1.

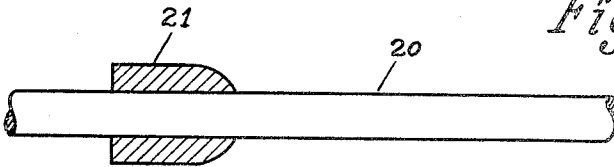


Fig. 2.

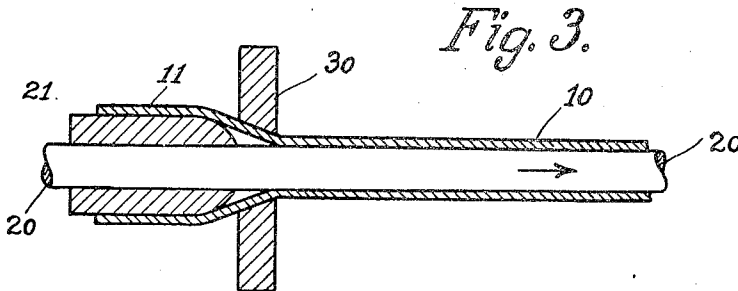


Fig. 3.

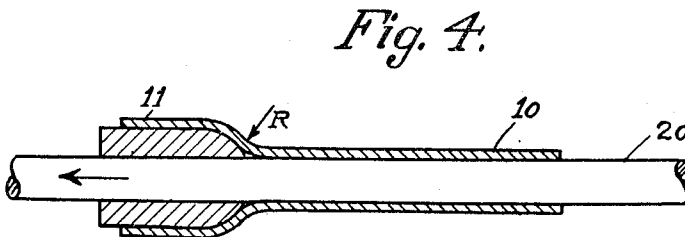


Fig. 4.

INVENTOR
HORACE A. STAPLES.
BY *Edward D. Winkley*
ATTORNEY

UNITED STATES PATENT OFFICE.

HORACE A. STAPLES, OF PLAINFIELD, NEW JERSEY, ASSIGNOR TO THE NATIONAL ELECTRIC PRODUCTS CORPORATION, OF NEW YORK, N. Y., A CORPORATION OF DELAWARE.

METHOD FOR MANUFACTURING TUBES WITH ENLARGED ENDS.

Application filed June 9, 1926. Serial No. 114,789.

My invention relates to a method of producing tubes with enlarged ends, or ends of special shape, more particularly to tubes for condensers that require a tube of two diameters and has for its object the production of such a tube with a connecting neck between the two diameters that is in cross section a reverse curve the radii of the curve being tangentially connected.

10 A further object is to produce a tube of uniform wall thickness substantially throughout its length no matter how the diameter changes.

The foregoing and other features of my invention will now be described in connection with the accompanying drawing forming part of this specification in which I have diagrammatically illustrated the various steps of my process as I prefer to practice it, after which I shall point out in the claims those features which I believe to be new and of my own invention.

Figure 1 illustrates the product as produced by my process showing the reverse curve to the neck.

Figure 2 illustrates the forming mandrel and drawing mandrel used for the particular shape tube illustrated in Fig. 1.

Figure 3 diagrammatically illustrates the drawing of the tube through a fixed die.

Figure 4 diagrammatically illustrates how the radius R of the reversed curve is formed in the tube, the last step in the process.

In the carrying out of my process I employ any standard apparatus used in drawing mills such as draw benches or presses, and as these are in common use and familiar to those skilled in the art they require no description herein. Two such draw benches or presses are required and are placed end to end so that they may operate in opposite directions.

My process will produce the tube shown in Figure 1 with the long shank 10, enlarged end 11, and the adjoining neck portion 12. The neck portion is formed so that the longitudinal section will take the shape of a gradually varying reverse curve with substantially the same wall thickness throughout. It will be observed that the section

shows a reverse curve with radii R and r producing curves which die into each other through tangential lines. It is this particular reverse curved section that is produced by my process sought to be patented.

Figure 2 shows diagrammatically a shaping mandrel 21 provided with a central longitudinal hole through which a drawing mandrel 20 is free to slide. It is perfectly obvious that the shape of the forming mandrel may be varied and thereby can produce any predetermined shape desired to the enlarged end 11. It is also obvious that this shaping mandrel can be used for expanding the diameter of end 11 if desired.

The tube with the mandrels inserted is put in either a draw bench or press and drawn through a fixed die 30 by pulling in one direction as shown in Figure 3. The other draw bench or press is then utilized to withdraw the drawing mandrel by pulling in the opposite direction which shapes the curved portion of the reverse neck 12 or the radius R of the section by reason of the force exerted on the tube due to friction between the drawing mandrel and the inside of the tube just drawn.

I wish it distinctly understood that my method for manufacturing tubes with enlarged ends herein described and illustrated is in the form in which I desire to practice it and that changes or variations may be made as may be convenient or desirable without departing from the salient features of my invention and I therefore intend the following claims to cover such modifications as naturally fall within the lines of invention.

I claim:—

1. A method of manufacturing tubes of different diameters, comprising the steps of drawing a tube part way of its length over an arbor forming that portion of the tube of small diameter, and a connecting portion of abrupt outline, holding the enlarged end and withdrawing the arbor through the enlarged end the friction between the small end and the arbor being momentarily sufficient to move the small end toward the large

end to change the outline between the same from an abrupt to an ogee form.

2. A method of manufacturing tubes with enlarged ends comprising the steps of placing the tube over a forming mandrel through which freely slides a drawing mandrel, drawing the tube and drawing mandrel through a die by pulling in one direction, withdrawing the drawing mandrel at the same time supporting the forming mandrel by pulling the drawing mandrel in the opposite direction whereby the enlarged end of the tube is formed into the desired ogee shape.

15 In testimony whereof I affix my signature.
HORACE A. STAPLES.

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