Feb. 7, 1956 H. C. DICOME 2,734,121

METHOD AND MEANS FOR ASSEMBLING ARTICLES

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Fig. 1

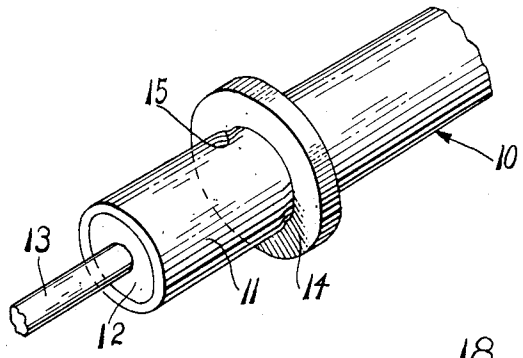
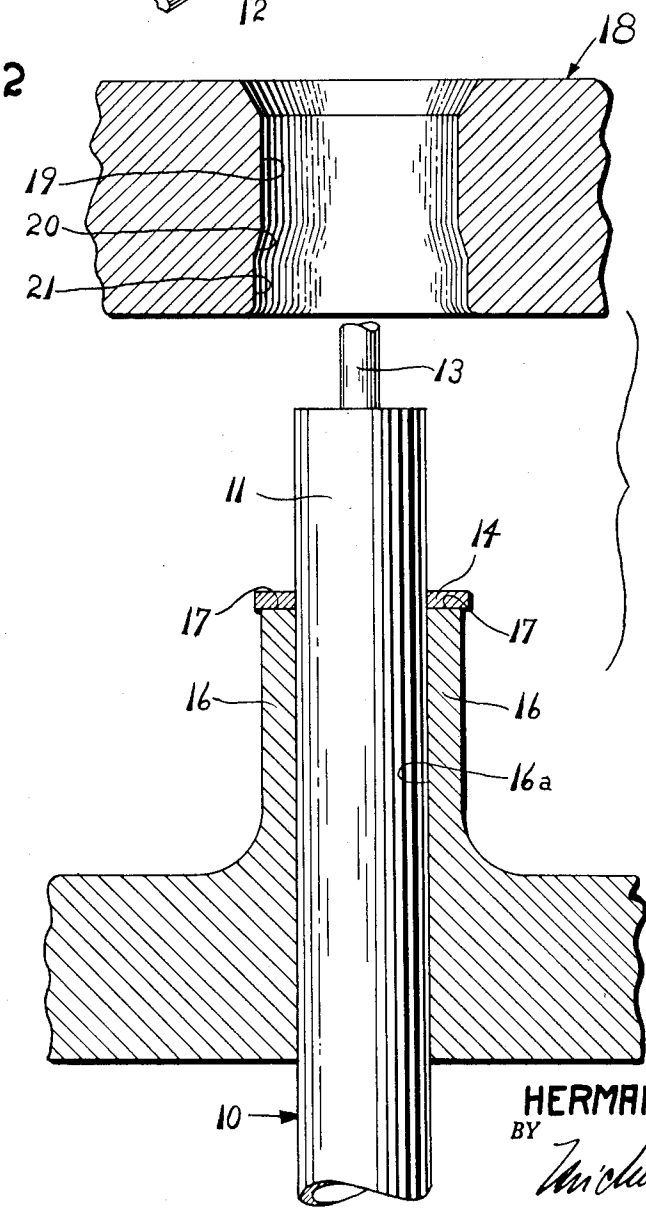


Fig. 2



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Fig. 3

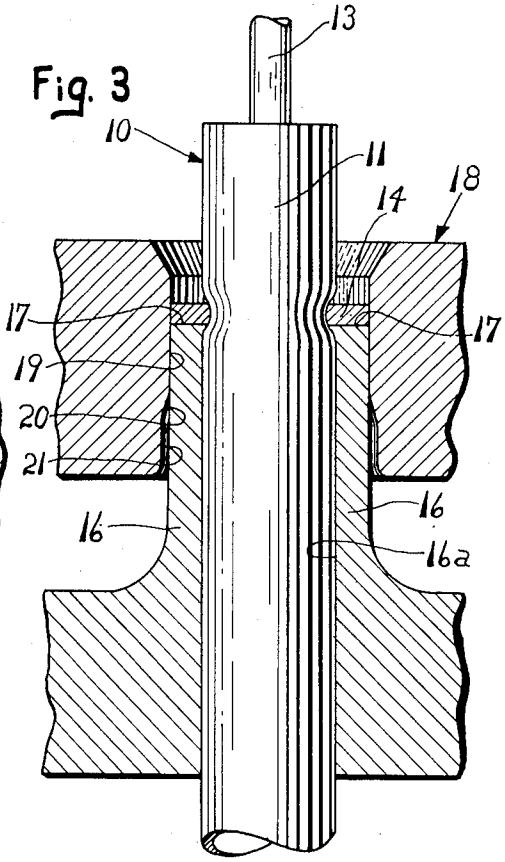
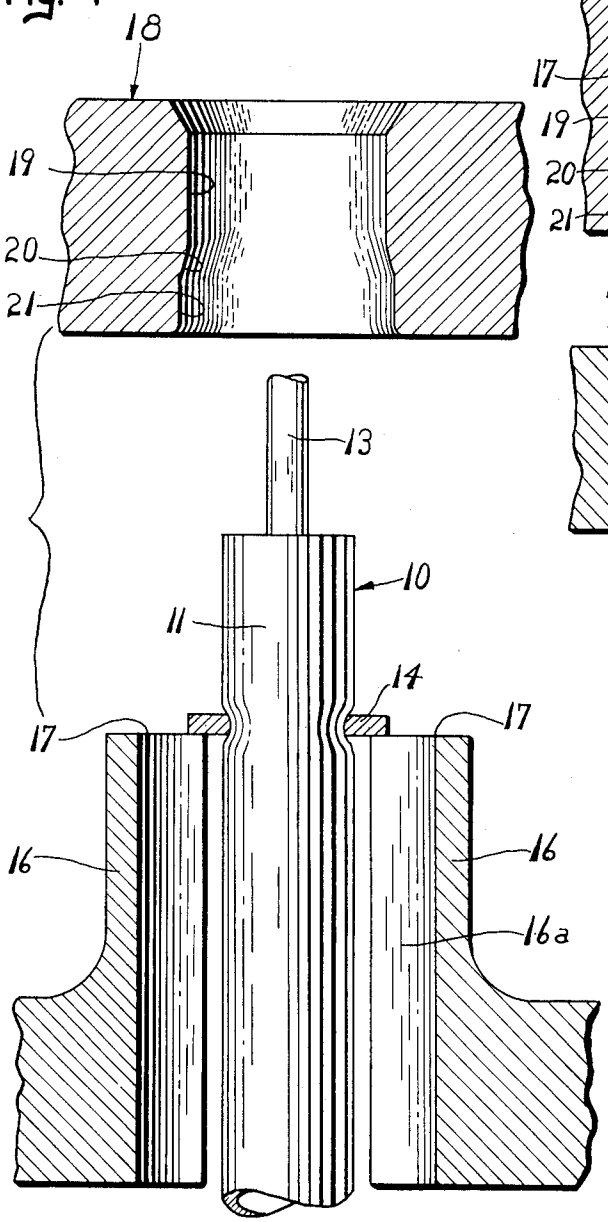


Fig. 4



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2,734,121

METHOD AND MEANS FOR ASSEMBLING ARTICLES

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Application May 11, 1953, Serial No. 354,152

3 Claims. (Cl. 219—38)

The present invention relates to a method of providing an elongated body with a radially extending shoulder and to an article of manufacture produced thereby, more particularly to a method of securing a radially extending shoulder to a sheathed-type electric heater and to the heater produced thereby, and the principal object of my invention is to provide new and improved methods and articles of the character described.

In the past, the manufacture of sheathed-type electric heaters with radially extending shoulders for purposes such as locating the heater with respect to a fixed point was an expensive and time consuming operation. These shoulders were usually welded or brazed to the sheath of the heater, a costly operation as will be understood. Furthermore, many of the so constructed heaters were rejected or failed in service because of a faulty bond between the shoulder and the heater sheath.

My invention provides a sheathed-type heater with an accurately located, radially extending shoulder that is quickly, inexpensively, and permanently affixed thereto. These and other advantages will become apparent from a study of the following description and of the drawings appended hereto.

In the drawings accompanying this specification and forming a part of this application there is shown, for purpose of illustration, an embodiment which my invention may assume, and in these drawings:

Figure 1 is a fragmentary perspective view of a sheathed-type electric heater formed in accordance with my invention, and

Figures 2, 3 and 4 are progressive stages of the operation employed in producing the heater illustrated in Figure 1.

As best shown in Figure 1, an electric heater **10** having the usual sheath **11** filled with compacted refractory material **12** has a conventional terminal pin **13** extending from the end thereof. It is to be understood that only one end of the heater **10** has been shown since both ends may be similar. It is also to be understood that in accordance with the usual practice, each terminal pin **13** may be electrically connected interiorly of the sheath **11** to respective ends of an electric resistance wire (not shown) embedded within the refractory material **12**. As illustrated, a shoulder member **14** extends radially of the heater **10** and is securely seated in an annular groove **15** formed in the sheath **11** by the following means:

In assembling the shoulder member **14** with the heater **10**, the heater is first securely gripped between arcuate separable jaws **16, 16** (see Figure 2) which together provide a bore **16***a* for closely receiving and gripping the heater.

In the embodiment of my invention herein shown, the member **14** has a washer-like configuration, the outside diameter thereof being larger than the outside diameter of the jaws **16, 16** and the inside diameter thereof being of a size to just pass the sheath **11** of the heater. The member **14** is preferably formed of a relatively high

tensile strength material such as steel for a purpose to be shown.

Figure 3 illustrates the operation of securing the member **14** to the heater **10**. As illustrated, a die **18**, having a bore **19** of a size to just pass the jaws **16—16**, is adapted to be pressed downwardly over the member **14** by any suitable means. The lowermost portion of the bore **19** is enlarged at **21** to the approximate outside diameter of the member **14** and a tapering wall portion **20** connects the bore portions **19** and **21**.

As will be clear, pressing the die **18** downwardly over the member **14** while the member is supported by the surface **17** will exert a tremendous radial force upon the periphery of the member thus compressing it toward the sheath **11**. As before mentioned, the member **14** is formed of high tensile strength material to eliminate any possibility of shearing the periphery of the member. Compressing the member **14** radially toward the sheath **11** will reduce the inside diameter of the member and force the aperture defining portion thereof into the adjacent wall surface of the sheath **11**. This will in turn reduce the diameter of the sheath at this point to provide an annular groove in which the member **14** is tightly seated. It has been found that the preceding operation has a tendency to slightly increase the thickness of the member **11**; however, this increase in thickness may be easily calculated and compensated for if desired.

After securing the member **14** to the sheath **11**, the heater **10** may be easily removed from the jaws **16—16** by first raising the die **18** (see figure 4) and then moving the jaws **16—16** away from each other to the position illustrated. This permits easy removal of the completed heater **10** from the jaws and permits insertion therebetween of another heater to initiate a repetition of the foregoing assembly operation.

In view of the foregoing it will be apparent to those skilled in the art that I have accomplished at least the principal object of my invention and it will also be apparent to those skilled in the art that the embodiment herein described may be variously changed and modified, without departing from the spirit of the invention, and that the invention is capable of uses and has advantages not herein specifically described, hence it will be appreciated that the herein disclosed embodiment is illustrative only, and that my invention is not limited thereto.

I claim:

1. The method of forming a fixed shoulder at a predetermined distance inwardly of an end of an elongated tubular metallic body, which comprises clamping a holding member about the outer side of said body to firmly hold the same and to provide a ledge surface extending peripherally about said body side at a predetermined distance inwardly of said body end, disposing a close fitting washer-like member about said body in position resting against said ledge surface, and relatively moving said holding member and a recessed die member to move a progressively constricting die surface in a direction toward said ledge surface and in radial pressing relation against the outer peripheral edge of said washer-like member with sufficient force to indent the inner peripheral edge of said washer-like member into the adjacent wall portion of said body.

2. The method of forming a shoulder a predetermined distance inwardly of an end of a sheathed embedded resistor electric heater of the type wherein a resistance conductor is disposed in a tubular metal sheath and has a terminal end accessible through said sheath end, and wherein the resistance conductor is surrounded by and embedded within an electric-insulating heat-conducting refractory material which substantially fills the sheath, said method comprising clamping a holding member about the outer side of said sheath and inwardly from the

sheath end to firmly hold said sheath and provide a ledge surface extending peripherally about said outer side at a predetermined distance inwardly of said sheath end, disposing a washer-like member about said sheath in position resting against said ledge surface, and moving a recessed die member in encompassing relation with said sheath in a direction axially thereof to move a progressively constricting die surface in a direction toward said ledge surface and in radial pressing relation against the outer peripheral edge of said washer-like member with sufficient force to indent the inner peripheral edge surface of said washer-like member into the adjacent wall portion of said sheath in opposition to the sheath backing provided by said refractory material.

3. An electric heating element, comprising a metal tubular sheath, a resistance conductor member having a terminal end extending through an opening at an end of said sheath, a refractory heat-conducting material

within the sheath for electrically insulating said conductor member and its terminal end from said sheath, and a locating shoulder at a selected position inwardly of said sheath end, comprising a metallic washer-like member encompassing the outer periphery of said sheath at said selected position and pressed radially inwardly to force its aperture-defining marginal surface into indenting and interlocking relation with the adjacent sheath wall whereby said washer-like member is locked in selected position.

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