

June 6, 1961

W. J. VOSS

2,987,599

HEATER ASSEMBLY

Filed Oct. 20, 1958

2 Sheets-Sheet 1

Fig. 1

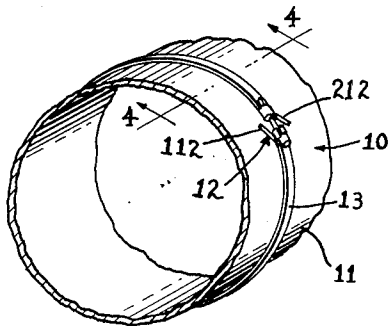


Fig. 2

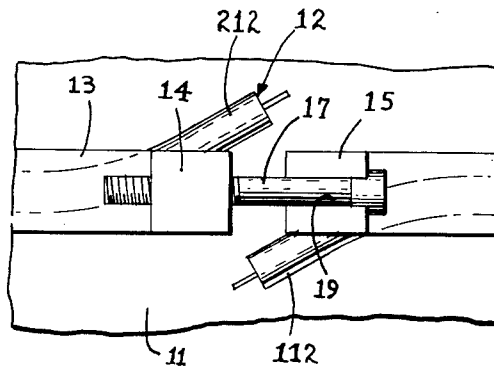


Fig. 3

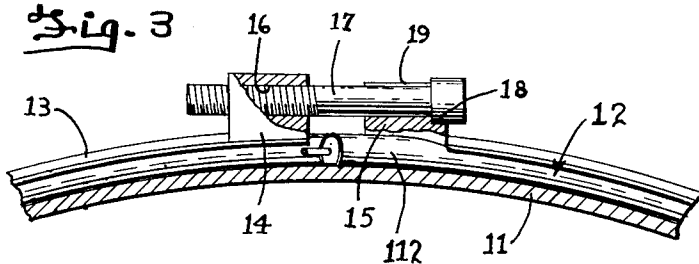


Fig. 4

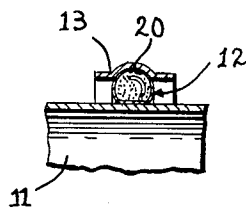
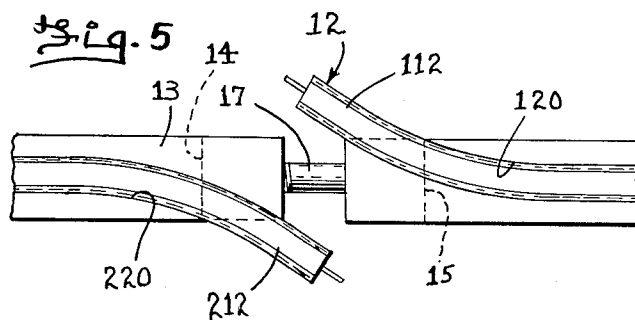


Fig. 5



INVENTOR.

WILLIAM J. VOSS

BY

W. J. Voss

Attorney

June 6, 1961

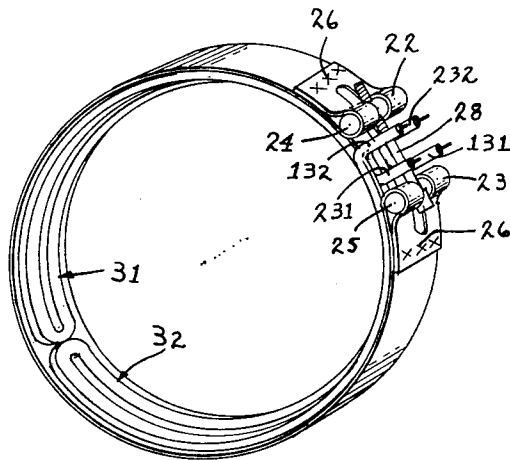
W. J. VOSS
HEATER ASSEMBLY

2,987,599

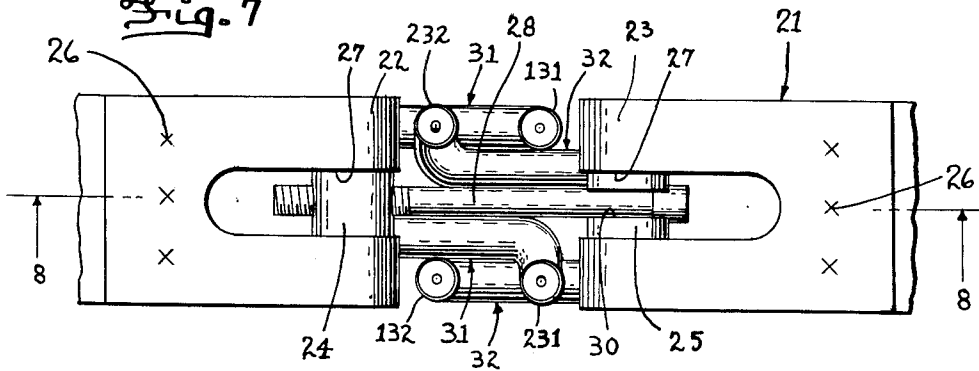
Filed Oct. 20, 1958

2 Sheets-Sheet 2

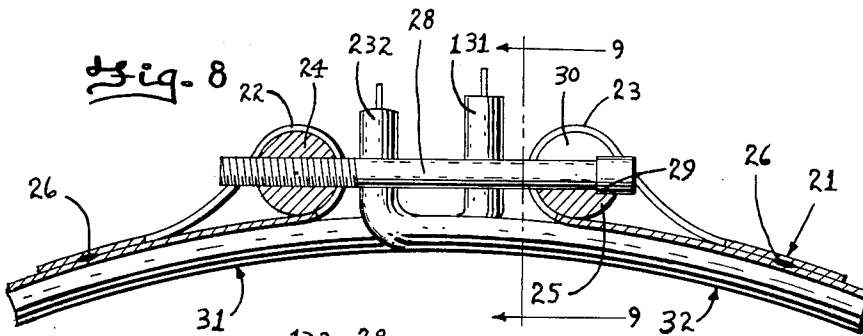
சு.பி. 6



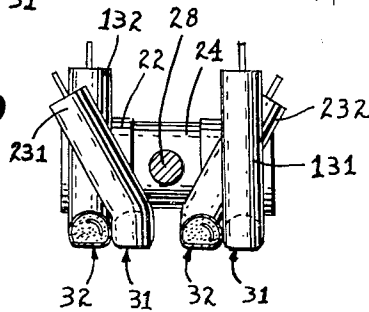
சு.பி. 7



சு.பி. 8



சு.பி. 9



INVENTOR.

WILLIAM J. VOSS

BY

Richard Williams

Attorney

1

2,987,599

HEATER ASSEMBLY

William J. Voss, Lakewood, Ohio, assignor to
Edwin L. Wiegand Company, Pittsburgh, Pa.

Filed Oct. 20, 1958, Ser. No. 768,289

8 Claims. (Cl. 219-19)

The present invention relates to electric heater assemblies, more particularly to heater assemblies of the type adapted to be wrapped about a body to be heated, and the principal object of the invention is to provide new and improved assemblies of the character described.

While heater assemblies of the type wherein a split band encircles a body to be heated and wherein an elongated heating element is interposed between the band and the body with its terminal end portions intermediate the spaced-apart band ends have long been known, such assemblies have had several disadvantages. One of such disadvantages of prior art heater assemblies was that the portion of the body adjacent the spaced-apart ends of the band was not engaged by the heating portion of the heating element and therefore uneven heating of the body resulted. Furthermore, attempts to reduce this unheated portion led to the positioning of the terminal ends of the element so closely together that it was difficult to make the necessary electrical connections thereto.

By means of a novel construction, the present invention provides a heater assembly which eliminates the previously mentioned disadvantages of prior art assemblies. Other advantages of the present invention will readily become apparent from a study of the following description and from the drawings appended hereto.

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

FIGURE 1 is a perspective view of a preferred embodiment of the invention shown assembled with a body to be heated,

FIGURE 2 is an enlarged, fragmentary, top plan view of a portion of the heater assembly seen in FIGURE 1,

FIGURE 3 is a fragmentary, side elevational view of the heater portion seen in FIGURE 2, portions on the near side being broken away for clarity,

FIGURE 4 is an enlarged, fragmentary sectional view generally corresponding to the line 4-4 of FIGURE 1,

FIGURE 5 is a plan view similar to FIGURE 2 but taken from the bottom side,

FIGURE 6 is a perspective view of another embodiment of the invention,

FIGURE 7 is an enlarged, fragmentary, top plan view of a portion of the embodiment seen in FIGURE 6,

FIGURE 8 is a sectional view generally corresponding to the line 8-8 of FIGURE 7, and

FIGURE 9 is a sectional view generally corresponding to the line 9-9 of FIGURE 8.

With reference to FIGURE 1, the numeral 10 designates a preferred embodiment of a heater assembly constructed in accordance with the present invention in position for heating a body 11. This body is herein shown to be round in cross-section and may, for example, be a tank or other tubular member. It will be understood, however, that body 11 may have other than a round cross-section and may comprise any other suitable body, either hollow or solid, to which it is desired to apply heat.

Briefly, heater assembly 10 presently comprises an elongated, sheathed electric resistance heating element 12 disposed about the body 11 with its terminals ends 112, 212 in adjoining relation and a split-type clamping band 13 which overlies the element and presses it firmly in position against the body. This heating element is of the usual type having a resistor conductor embedded in electric-

2

insulating heat-conductive material and encased in a tubular metallic sheath. The usual terminal pins are connected to the resistor inwardly of the sheath ends and such pins protrude beyond respective ends of the sheath to provide for making the necessary electrical connections to the heater. The element may have any desired cross-sectional configuration such as, as herein shown, a generally round configuration but with a flat side which engages the body and thus provides for better heat transfer therebetween.

For a purpose to be disclosed and as best seen in FIGURE 3, the ends of the band carry respective abutments 14, 15 which are welded or otherwise secured thereto. Abutment 14 has a threaded aperture 16 for receiving the threaded shank of a capscREW 17 and the abutment 15 has a recess 18 providing a seat for the head of the screw 17. For a purpose to appear abutment 15 has an upwardly (in the position of parts seen in FIGURE 3) facing slot 19 of a size to slidably pass the shank of the screw.

With the capscREW 17 assembled as seen in FIGURE 3 with the abutments 14, 15 provided by respective band ends, the latter may readily be drawn toward each other by means of the capscREW for the purpose of tensioning the band about the body and thus clamping the heating element thereagainst. It will be noted that the band and the element are herein shown assembled with the ends of the band adjacent respective terminal ends 112, 212 of the element.

As best seen in FIGURE 4, the intermediate portion of the band 13 has a groove 20 formed in the side of the band facing the body and, with the exception of the groove end portions, the groove is spaced between the side edges of the band. The end portions of the groove are, of course, positioned at respective ends of the band and as best seen in FIGURE 5, one end portion 120 of the groove is curved to intersect one side edge of the band while the other end portion 220 is curved in the opposite direction to intersect the other side edge of the band.

Assembly of the foregoing parts will preferably be as follows: The element 12 will first be disposed about the body with its terminal end portions in adjoining relation. The band 13, with capscREW 17 threaded into abutment 14, will then be disposed about the body with the intermediate portion of the element disposed in the intermediate portion of the band groove 20 and with the terminal end portions 112, 212 of the element disposed in respective groove end portions 120, 220. The head of the capscREW will then be seated in recess 18 of abutment 15 by moving the screw transversely through the slot 19 in this abutment. The screw will then be tightened to draw the band ends together to thus tightly clamp the heating element about the body.

With the element positioned in the band groove as above described, it will be evident that the terminal ends of the element are disposed on opposite sides of the capscREW 17 and are therefore spaced-apart sufficiently that the necessary electrical connections to the respective element ends may readily be made. It will also be evident that with the element ends so disposed for non-interference with each other, the band may be so proportioned that its ends are quite close together when it is tensioned about the body. This is in contrast to some prior art constructions wherein the band ends are spaced quite widely to provide for the disposition therebetween of the element ends. The advantage of having the band ends close together is that a greater length of element may be pressed against the body to reduce to a minimum the body portion adjacent the ends of the element which is not engaged by the heat generating portion of the element and which is therefore unheated.

3

In the embodiment of the invention seen in FIGURES 6 through 9, a pair of heating elements of a type similar to that heretofore described are employed. This has the advantage of increasing the amount of heat which can be applied to the body and also, because of the manner in which the elements are arranged, obviates the necessity of wrapping a heating element entirely around the body since such operation may be somewhat difficult if not impractical under certain conditions.

With reference to FIGURE 6, the band 21 therein disclosed is somewhat wider than the one heretofore described. This band also differs in that its end portions are bent back on themselves to form respective loops 22, 23 in which rod-like trunnion members 24, 25 are respectively pivotable. The overlapped band end portions may be retained in position by welding or the like as indicated at 26. The intermediate portions of loops 22, 23 (see also FIGURES 7 and 8) are slotted at 27 to pass a capscrew 28 as will later appear.

Trunnion member 24 (see FIGURES 7 and 8) has a transversely extending, threaded aperture for receiving the threaded shank of the capscrew 28 while trunnion member 25 has a recess 29 providing a seat for the head of the capscrew. Member 25 also has a slot 30 for transversely passing the shank of the capscrew to facilitate its ready assembly and disassembly with trunnion member 25.

Each heating element 31, 32 (see especially FIGURE 6) is doubled back on itself to dispose its terminal ends in adjoining relation. The element thus provided is also curved transversely to fit about the rounded (insofar as the present embodiment is concerned) exterior of the body to be heated. The terminal ends 131, 231 of element 31 are bent to extend in a direction outwardly of the body to be heated while the terminal ends 132, 232 of element 32 are similarly bent.

Elements 31, 32 are adapted to be positioned about the body to be heated with their bight ends in end-to-end adjoining relation as seen in FIGURE 6 and with their terminal ends in side-by-side, overlapping relation. The band 21 will then be wrapped about the body and over the elements to dispose the terminal end portions thereof between the band end portions.

The shank of capscrew 28 will then be moved transversely in the slot 30 of the trunnion member 25 to engage the screw head in the recess 29 of this trunnion member. The capscrew will then be tightened to draw the band ends together and tighten it about the elements and thus secure them against the body. The usual electrical connections may then be made to the terminal pins projecting from respective terminal ends of the elements.

As best illustrated in FIGURE 7, it will be seen that the terminal ends 131, 232, of respective elements 31, 32 are disposed on one side of the capscrew 28 while the terminal ends 231, 132 of such elements are disposed on the other side of the capscrew. This insures the desirable separation of these element legs as will be apparent.

In order to avoid interference between the element terminal ends 231, 232 which are adjacent to but on opposite sides of the capscrew 28, these terminal ends are bent in opposite directions, as best seen in FIGURE 8, to clear the capscrew.

As best seen in FIGURE 7, the terminal end portion of each element extends beyond the midpoint of the space between the band ends so that such element ends are disposed in side-by-side, overlapping relation as previously mentioned. This is highly advantageous in that the elements engage with and span the body portion adjacent the space between the band ends and thus apply heat to such body portion. This effects a desirably even application of heat to the body.

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 embodiments

4

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 embodiments are illustrative only, and that my invention is not limited thereto.

I claim:

1. A clamp-on electric heater assembly, comprising a split-type clamping band encircling a body to be heated and having its end portions disposed in adjoining relation and providing respective abutments extending in a direction away from said body, an electric heating element interposed between said band and said body and secured in position against the latter by said band, and an elongated tension member engaged with respective abutments for connecting said band end portions together and for drawing them in a direction toward each other to tension said band about said body, one of said abutments having a seat for removably receiving a headed portion of said tension member and also having a slot extending from its margin to its seat and providing for transverse movement of said tension member toward and away from its seat whereby said tension member is readily assemblable and disassemblable with said one abutment, and the other of said abutments having a threaded opening for screw threadedly receiving a threaded part of said tension member.

2. A clamp-on electric heater assembly, comprising a split-type clamping band encircling a body to be heated, said band having its end portions disposed in adjoining relation and having a continuous groove formed in that side thereof adjacent said body, the intermediate portion of said groove being co-extensive with the intermediate portion of said band and being spaced between the side edges of the latter and the terminal ends of said groove being adjacent respective band ends and each groove end extending transversely to intersect a side edge of said band, and an elongated electric heating element interposed between said band and said body and secured in position against the latter by said band, said element being seated in said band groove with its end portions within respective groove end portions to insure proper location of such element portions.

3. A clamp-on electric heater assembly, comprising a split-type clamping band encircling a body to be heated, said band having its end portions disposed in adjoining relation and having a continuous groove formed in that side thereof adjacent said body, the intermediate portion of said groove being co-extensive with the intermediate portion of said band and being spaced between the side edges of the latter and the terminal ends of said groove being adjacent respective band ends and each groove end extending transversely to intersect a respective side edge of said band, a tension member connecting said band end portions together and drawing them in a direction toward each other to tension said band about said body, and an elongated, tubular sheathed electric resistance heating element interposed between said band and said body and secured in position against the latter by said band, said element being seated in said band groove with its end portions within respective groove end portions to insure proper location of such element portions.

4. A clamp-on electric heater assembly, comprising an elongated clamping band having its end portions doubled back on themselves to provide respective loops thereat and said band encircling a body to be heated and having its looped ends disposed in adjoining relation, an electric heating element interposed between said band and said body and secured in position against the latter by said band, a pair of trunnion members pivotally seated in respective loops, and an elongated tension member engaged with respective trunnion members for connecting said band ends together and for drawing them in a direction toward each other to tension said band about said body,

5

one of said trunnion members having a slot facing away from said body and providing for transverse movement of said tension member toward and away from engagement with said one trunnion member whereby said tension member is readily assemblable and disassemblable with said one trunnion member.

5. A clamp-on electric heater assembly, comprising a split-type clamping band encircling a body to be heated and having its end portions disposed in spaced adjoining relation, an elongated tension member connecting said band end portions together and drawing them in a direction toward each other to tension said band about said body, and a pair of elongated, tubular sheathed electric resistance heating elements each doubled back upon itself to dispose its terminal end portions in adjoining relation and each element being interposed between said band and said body and secured in position against the latter by said band, the bight ends of respective elements being disposed in end to end adjoining relation and the terminal ends of respective elements each extending beyond the midpoint of the space between said band ends whereby said elements span such space to effect heating of said body thereat, respective terminal ends of each element being disposed on opposite sides of said tension member to insure separation thereof and said terminal ends extending transversely of said tension member to facilitate making electrical connections thereto.

6. A clamp-on electric heater assembly, comprising a split-type clamping band encircling a body to be heated and having its end portions disposed in adjoining but spaced relation, a tension member connecting said end portions and drawing them in a direction toward each other to tension said band about the body, and a looped

6

sheathed electric heating element disposed about said body in contact therewith, said band overlying said heater and securing the same to the body, the loop of said heating element being greater than the transverse periphery of the body so that end portions of said heater overlap to provide for heating throughout said transverse periphery, said end portions being disposed at the band split and at least one being bent away from the other to afford clearance therebetween.

7. The construction according to claim 6 and wherein said end portions are disposed on opposite sides of said tension member to insure separation thereof.

8. A clamp-on electric heater assembly comprising an elongated, tubular sheathed electric resistance heater means wrapped about a body to be heated with respective heater means ends in over-lapping, side-by-side relation to completely encircle the body, a split-type clamping band encircling the body and overlying said heater means, and means for drawing said band ends toward each other to tension said band and thus urge said heater means into intimate heat transfer relation with the body.

References Cited in the file of this patent

UNITED STATES PATENTS

2,029,075	Knight	Jan. 28, 1936
2,510,456	Biebel	June 6, 1950
2,725,457	Norton	Nov. 29, 1955
2,740,035	Young	Mar. 27, 1956
2,742,561	Flater	Apr. 17, 1956
2,748,252	Williams et al.	May 29, 1956
2,754,406	Browne	July 10, 1956
2,851,577	Bolds et al.	Sept. 9, 1958