July 17, 1962

W. W. SELLERS

ELECTRIC HEATER

3,045,097

Filed June 1, 1959

4 Sheets-Sheet 1

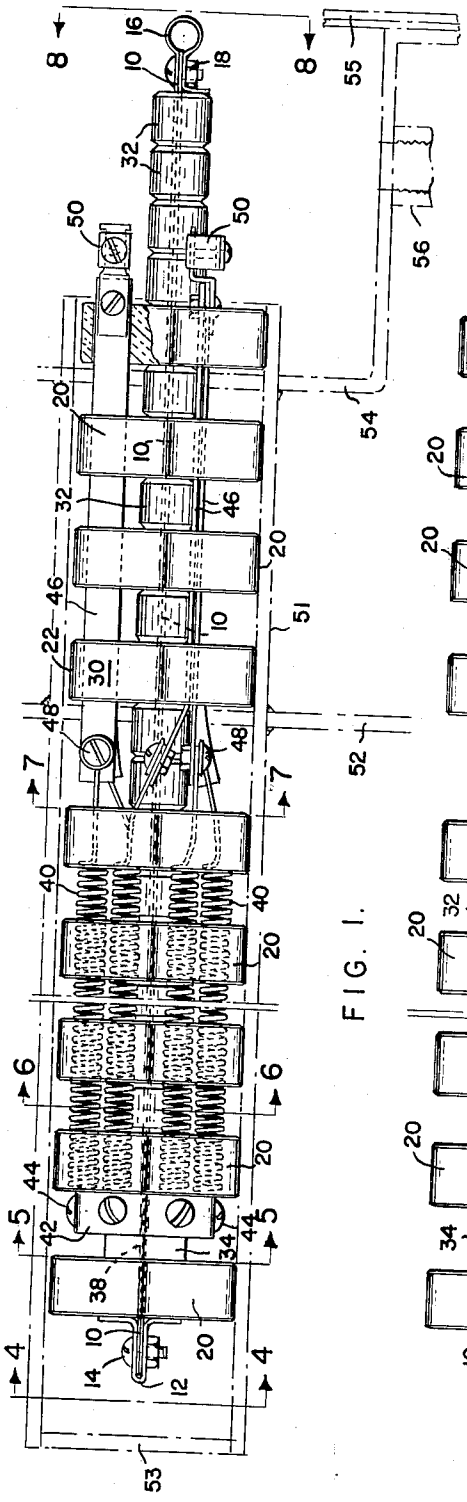

FIG. 1.

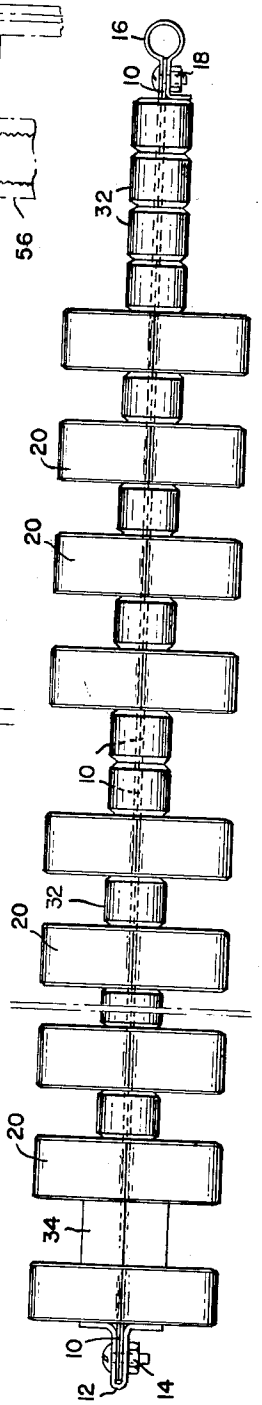

FIG. 2.

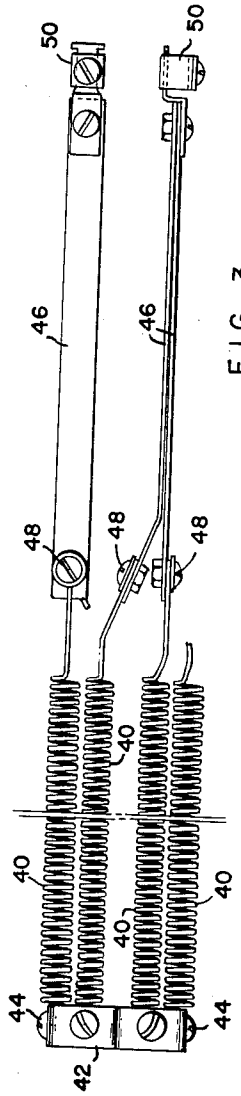

FIG. 3.

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ELECTRIC HEATER

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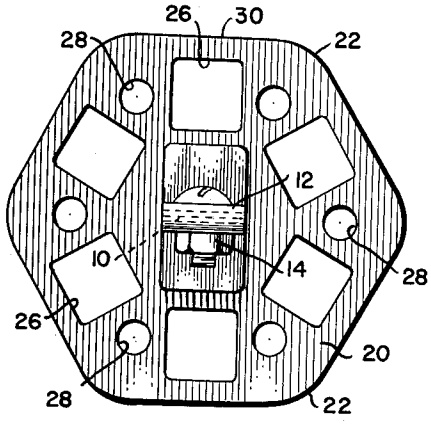

FIG. 4.

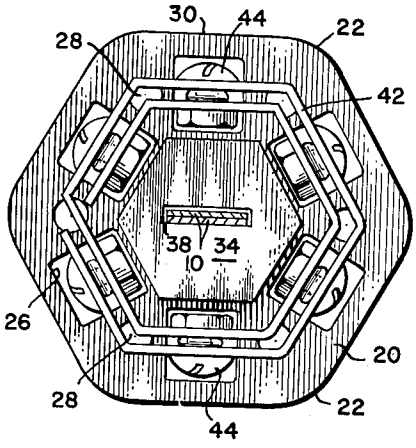

FIG. 5.

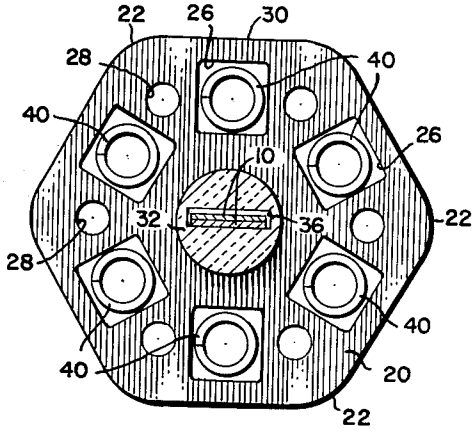

FIG. 6.

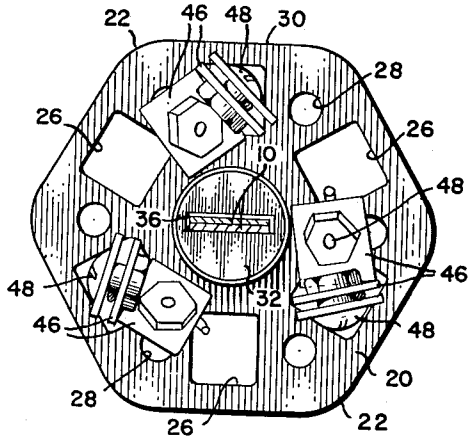

FIG. 7.

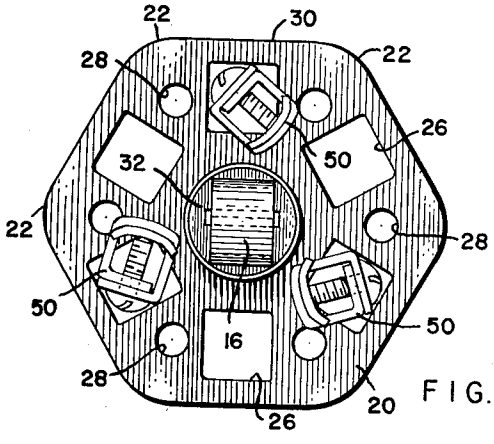

FIG. 8.

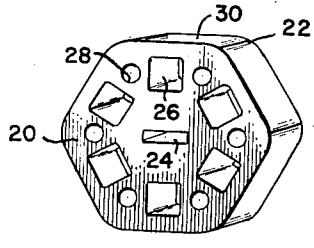

FIG. 9.

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3,045,097

ELECTRIC HEATER

Filed June 1, 1959

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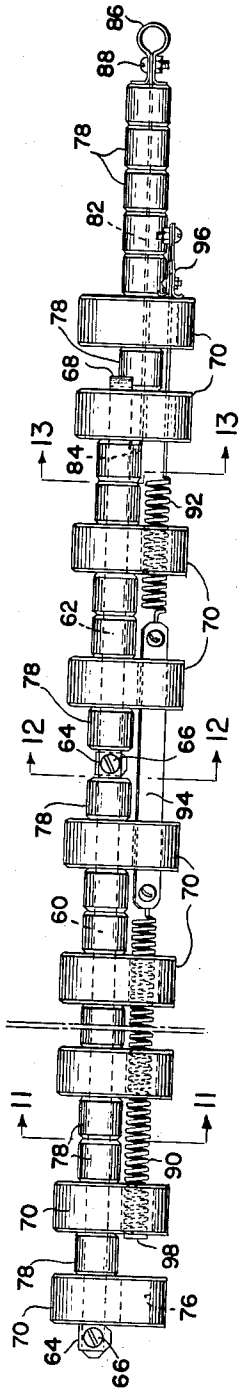

FIG. 10.

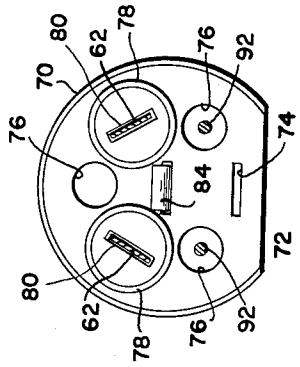

FIG. 13.

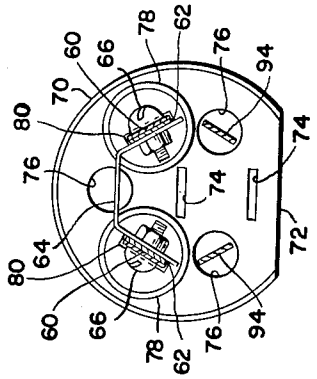

FIG. 12.

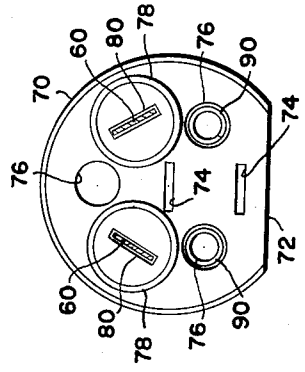

FIG. 11

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ELECTRIC HEATER

Filed June 1, 1959

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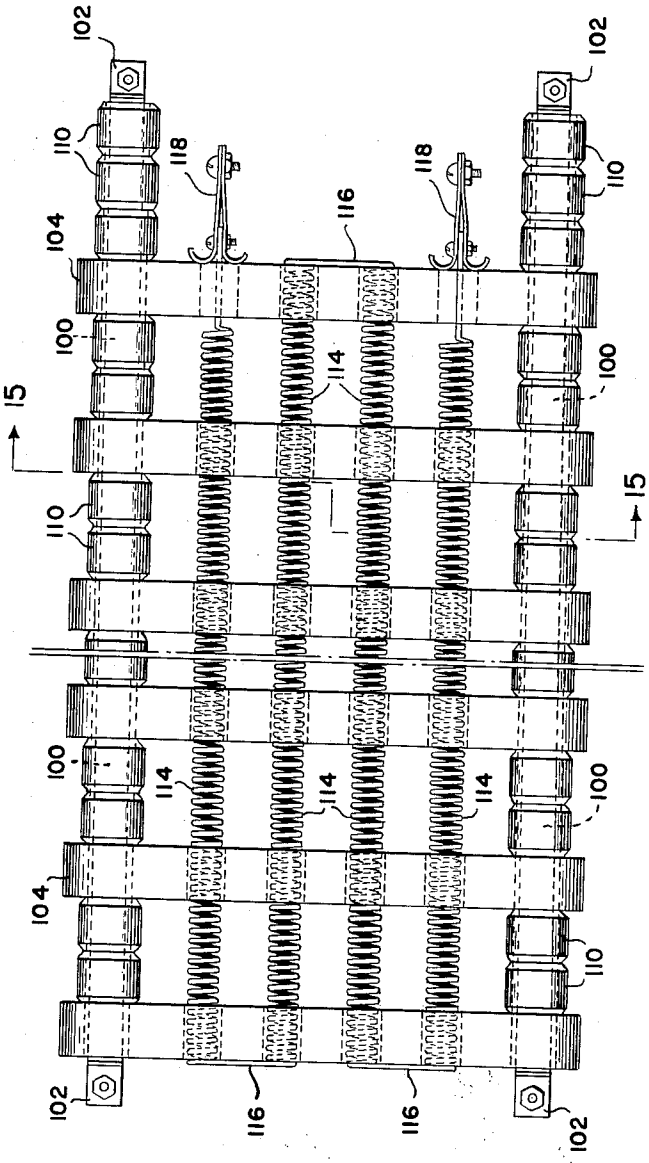

FIG. 14

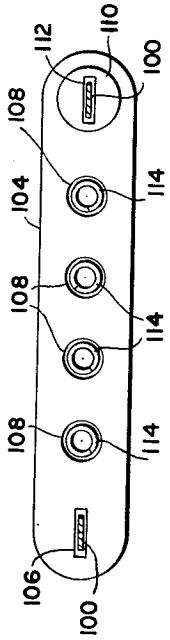

FIG. 15.

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United States Patent Office 3,045,097 Patented July 17, 1962

3,045,097

ELECTRIC HEATER

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(% The Sellers Co., 815 Loraine Ave., Ardmore, Pa.)

Filed June 1, 1959, Ser. No. 817,297
14 Claims. (Cl. 219—19)

The present invention relates generally to electric heaters, and particularly to heaters of the type used to prevent the freezing of water pipes in winter and maintain the flow of heavy viscous materials in pipes or tanks, which heaters may vary greatly in length, some being very long.

The type of heater with which this invention is concerned finds wide application as a component part of electrically heated equipment, such as air and gas heaters, circulating type heat exchangers, radiant heaters, immersion heaters, tank heating equipment, pipe line heating equipment, ice melting equipment, ovens.

A heater of the type aforesaid commonly comprises a core in the form of a multiplicity of insulator or refractory elements strung upon an elongated member in the form of a solid or hollow bar that is round in transverse section, or in the form of a flat narrow strap. These refractory elements mount electric resistor elements that extend substantially the full length of the core. The use of a round bar as the insulation mount has not proved to be entirely satisfactory because such a bar offers no resistance to twisting of the core assembly about its principal axis, in consequence of which upon twisting of the core assembly, the electric resistor elements are twisted, which of course, is not desirable. In the use of a flat narrow strap as the insulation mount, it is common to seat the refractory elements upon longitudinally spaced portions of the strap and to fasten each of the refractory elements in place through the medium of a pair of clips struck out of the underlying portion of the strap. This arrangement has not proved to be entirely satisfactory either because, while the strap will control twisting of the core assembly, the clips struck out of the strap fix the locations of the refractory elements, in consequence of which there is no flexibility in the arrangement of the refractory elements. In addition, the refractory elements, being somewhat fragile, may be torn away with ease from the clips anchoring them to the strap, as when the core assembly is twisted or bent. In the installation of this type of heater in a long straight tube or in a curved tube the pressure required to insert the heater in the tube can cause the heater to hump and hang up in the tube, making it impossible to either complete the inserting of the heater or withdraw the heater without destroying the heater. To repair a broken insulator in the center of the heater all of the coils have to be withdrawn from the insulators at least up to that point and then reinserted after a new insulator has been set in. Also this design permits little tension on the coils to prevent them from drooping when heated. Greater tension, which is desirable, is not practical as it tends to cause deformation of the backing strip and porcelain damage when installing in a tube. Accordingly, a principal object of the present invention is to provide a core assembly having improved insulation mounting means, as part of a superior heater construction which can be manufactured, transported and maintained at less cost and one which affords greater flexibility in design and makes possible the manufacture of new and superior electrically heated products.

A principal object of the present invention is to provide a core assembly wherein the refractory core elements are strung like beads upon an elongated flexible member operative to secure the same against turning relative to one another about the principal axis of the core.

Another principal object of the present invention is to provide a core assembly wherein the insulation mounting means in constructed essentially of thin flexible metallic straps having the refractory elements strung thereon like beads.

Still another principal object of the present invention is to provide a core assembly wherein the refractory core elements are strung like beads upon a metallic strap sufficiently thin and flexible to render the core assembly somewhat flexible thereby to provide more effectively for projection of the heater into a curved heater tube.

An important object of the present invention is to provide a core assembly wherein the resistor elements may be conveniently interconnected optionally in a variety of different ways, for example for single phase, two phase and three phase delta and star delta connections, and to allow for terminals at both ends, when design considerations make this more practical.

Another important object of the present invention is to provide an electric heater of the type aforesaid wherein the resistor elements are connected in Y and the terminals of said elements are all at the same end of said heater to facilitate connection to a three phase source of electric power.

Other objects and advantages of the present invention will appear more fully hereinafter, it being understood that said invention consists substantially in the combination, construction, location and general arrangement of parts, all as described in detail in the following specification, as shown in the accompanying drawings and as finally pointed out in the appended claims.

In the accompanying drawings:

FIGURE 1 is an elevation of an electric heater constructed in accordance with and embodying the principles of the present invention;

FIGURES 2 and 3 are the same as FIGURE 1, but FIGURE 2 shows the heater core alone and FIGURE 3 shows the assembly of resistor elements alone;

FIGURE 4 is an enlarged end view of the electric heater, as indicated by the line **4—4** of FIGURE 1;

FIGURES 5, 6 and 7 are enlarged transverse sections respectively on lines **5—5**, **6—6** and **7—7** of FIGURE 1;

FIGURE 8 is an enlarged end view of the electric heater, as indicated by the lines **8—8** of FIGURE 1;

FIGURE 9 is a perspective view of a dielectric member forming a component part of the heater core;

FIGURE 10 is an elevation of a modified form of the electric heater;

FIGURES 11, 12 and 13 are transverse sections respectively on lines **11—11**, **12—12** and **13—13** of FIGURE 10;

FIGURE 14 is an elevation of a second modified form of the electric heater; and

FIGURE 15 is a transverse section on line **15—15** of FIGURE 14.

Referring particularly to FIGURE 2, the core of the electric heater constructed in accordance with and embodying the principles of the present invention comprises two flat mutually overlying rather thin straps of metal conjointly forming an elongated flexible member **10**. A U-shaped clip **12** is fitted over one end of the member **10** and bolted through the straps, as at **14**. At the opposite end of the member **10**, one of the straps is turned back in a loop **16** and the straps bolted together, as at **18**.

Carried by the elongated member **10** are a number of identical ceramic disc members **20**. Referring particularly to FIGURE 9, the discs **20** are generally hexagonal in shape, the corners thereof being rounded, as at **22**. These discs are centrally apertured, as at **24**, for an easy sliding fit over, and thereby being secured against turning about, the elongated member **10**. In addition to the aperture **24**, each disc is provided with a set of six square apertures **25**

and a set of six round apertures 28, all angularly spaced equally about the central axis of the core, the apertures 26 and 28 being arranged alternately and the six square apertures 26 being disposed respectively opposite the six sides of said disc, designated 30.

Also carried by the elongated member 10 are a number of identical ceramic spacer members 32 of cylindrical shape, and a ceramic spacer 34 of hexagonal shape in transverse section. These, too, are centrally apertured, respectively at 36 and 38, for an easy sliding fit over, and thereby being secured against turning about, the elongated member 10.

The disc members 20, the spacer members 32 and the spacer member 34 are strung like beads upon the elongated member 10 with very little or no play between successive ones thereof and secured against any substantial axial shifting movement by the clip 12 and the looped strap portion 16. The several ceramic parts 20, 32 and 34 are arranged with at least one spacer between each two successive discs 20, the spacer 34 being disposed at one end of the core between the two discs 20 nearest the clip 12, a pair of the spacers 32 are disposed between a pair of the discs 20 proximate the opposite end of the core, and four of the spacers 34 are disposed between the looped strap portion 16 and the disc 20 nearest the latter. In the assembled condition of the core, corresponding square apertures 26 respectively formed in the several discs 20 are aligned, for a purpose to appear.

Referring particularly to FIGURE 3, the assembly of resistor elements of the electric heater constructed in accordance with and embodying the principles of the present invention comprises a set of six identical electric resistor elements in the form of heating coils 40 disposed in laterally spaced parallel relation. A metal strap is suitably bent to form a hexagonal collar 42, and corresponding ends of the heating elements 40 are projected between two convolutions of the collar 42 and fastened thereto by bolts 44. The assembly also comprises a set of six metal bus bars 46 respectively extending in longitudinal continuation of the heating coils 40, being fastened thereto, as by bolts 48. The bus bars 46 are paired, and the free ends of each pair of bus bars are secured together by a terminal fitting, generally designated 50, thereby to provide a total of three such terminals for connection to a three phase source of power. It will be observed that the assembly of heater elements are connected in Y, and that each pair of the heating elements 40 are connected in parallel and conjointly constitute one branch of the Y. Optionally, the heating elements 40 may be connected in delta, or in other ways, it being obvious that the overall arrangement of the component parts of the core assembly favors selectivity in this respect.

Now referring to FIGURES 1 and 4 through 8, in the fully assembled condition of the electric heater each heating coil 40 is projected through aligned square apertures 26 respectively formed in a number of the discs 20. It will be understood that the discs 20 preferably are spaced approximately two inches apart so as to afford adequate support for the heater coils 40, which latter may range from only a few to many feet in length. The collar 42 is disposed in embracing relation to the spacer 34, as best shown in FIGURE 5. The several connections between the heating coils 40 and the bus bars 46 are disposed between the pair of discs 20 separated by two of the members 32, and each pair of the bus bars 46 are projected together freely through the same aligned square apertures 26 respectively formed in the remainder of the discs 20, the terminal fittings being disposed beyond the endmost disc 20, and being fully exposed for convenient access thereto.

Referring particularly to FIGURE 1, the electric heater is slidably received by a heater tube 51 that is projected into a tank, being rigidly secured, as by welding, to the outer wall of the latter, designated 52. The main end of the heater tube is closed, as at 53, and the

outer end of the heater tube mounts a terminal box 54 fitted with a removable cover 55 and a coupling 56 for a conduit through which wire leads (not shown) are introduced into the terminal box for connection to the terminals 50 of the bus bars 46. The terminal box 54 is spaced outwardly from the tank wall 52 to allow room for insulation applied to the outer side of the tank wall 52, between the latter and the terminal box. It will be evident that in the operation of the electric heater, heat generated by the coils 40 radiates to the walls of the heater tube, from whence it heats the material in the tank.

An electric heater constructed in accordance with and embodying the principles of the present invention may be projected into and removed from a heater tube as a unit, with a minimum expenditure of time and effort.

To disassemble such a heater, it is merely necessary to remove the clip 12, whereupon the endmost disc 20 and the spacer 34 may be slipped off the member 10. Then the heater coils 40 and the bus bars 46 are disconnected by removing the bolts 48, whereupon the several heater coils 40 and the collar 42 may be removed as a unit by pulling on the latter, and the bus bars 46 may be removed by pulling on the terminals 50. Now the spacers 32 and the other discs 20 may be slipped off the member 10 one by one. Of course, to reassemble the unit, the procedure just outlined may be carried out in reverse order.

To repair a broken insulator 20 or 32 in the center of the heater it only requires breaking out the damaged insulators 20 and any spacers 32 necessary to preserve the arrangement, remove clip 12, end insulator 20, spacer 34 and collar 42 and slip on the required number of insulators 20 and spacers 32 and reassemble. This can easily be done without having to withdraw any of the coils 40, making repair quicker and far less costly than similar repair of heaters of different construction.

Obviously, since the unit can be disassembled and reassembled with ease, it may be shipped in assembled or knocked down condition depending upon costs. In addition, it may be manufactured, broken parts may be replaced and it may be inspected with a minimum expenditure of time and effort, and with the utmost economy.

It may be noted that a heater embodying the present invention allows greater tension to be imposed on each coil as it is assembled than can be imposed upon the coils of other known heaters. This is desirable as it prevents coil sag when power is applied. This is a particularly valuable feature having greater significance the higher the voltage imposed and the higher the temperature of the coils 40.

It will be observed that there is much duplication of parts. The different ceramic parts are only three in number. This number could be reduced to two by substituting a spacer 32 for the spacer 34. In addition, all of the heating coils 40 are identical, all of the bus bars 46 are identical, and all of the terminals 50 are identical. This feature, of course, favors simplicity in design and manufacture.

As noted above, discs 20 and spacers 32 and 34 cannot turn about the member 10, and obviously the latter cannot readily be twisted, in consequence of which the member 10 is effective to control twisting of the core assembly about its central axis without any assistance from the heating coils 40. Thus the heating coils 40 are substantially free from stresses induced by twisting of the core assembly. In addition, the flexibility of the elongated member 10 and the arrangement of the discs and spacers thereon render the fully assembled unit somewhat flexible so that it is capable of following the curvature of a curved heater tube. Furthermore, it may be noted that while the length of the elongated member 10 determines the maximum number of refractory members that may be mounted thereof, the same may be arranged upon the elongated member 10 in any manner desired, with at least one spacer between each adjacent pair of discs.

In the event that it is desirable not to expose a portion of all of the coiled section of coils **40**, a successive number of discs **20** may be threaded on strip **10** to give the coil complete protection from external damage.

In the modified form of the electric heater illustrated in FIGURES 10–13, the core comprises an assembly of metal strap members including a pair of longitudinally extending laterally spaced sections **60**, a pair of longitudinally extending laterally spaced sections **62**, and a pair of transversely extending cross ties **64**. Each of the latter extends horizontally, and the opposite end portions thereof are turned downwardly and disposed in underlying relation to the longitudinally extending strap sections. At one end of the heater, corresponding end portions of the strap sections **60** are joined together by one of the cross ties **64** and bolts **66**. Intermediate the ends of the heater, on each side thereof, the meeting end portions of the strap sections **60** and **62** are overlapped and joined together by a turned down end portion of the other cross tie **64**. At the other end of the heater, the end portions of the strap sections **62** are turned over to form abutments **68** for a purpose to appear.

Carried by the strap sections **60** and **62** are a number of identical ceramic disc members **70**. These discs are round, except at their bottoms, where they are flat, as at **72**. Four rectangular apertures **74** extend through the disc, one through the center and three being circumferentially spaced equally, near the periphery of the disc, as shown. In addition, three round apertures **76** extend through the disc, being circumferentially spaced equally, near the periphery of the disc, as shown.

Also carried by the strap sections **60** and **62** are a number of identical ceramic spacer members **78** of cylindrical shape and provided with rectangular central apertures **80**, as shown.

The disc members **70** and the spacer members **78** are strung like beads upon the strap sections **60** and **62**, on each side of the heater, with very little or no play between successive ones thereof and secured against any substantial axial shifting movement by the cross ties **64**, or by a cross tie **64** and the abutments **68**. The several ceramic discs **70** are arranged with at least one spacer **78** between each two successive discs **70**. The cross tie **64** intermediate the ends of the heater is disposed between spacer members **78**, as shown.

Extending through the central aperture **74** of the disc **70** next to the abutments **68**, in longitudinal continuation of the strap sections **62**, is a strap section **82** having fitted thereover a pair of discs **70** and several spacers **78** secured against any substantial axial shifting movement by an abutment in the form of a turned up end portion **84** of the strap section **82** and a clip **86** secured to the extreme end portion of the strap section **82**, as by a bolt **88**, all as shown.

It may be noted that in addition to the core section extending between the cross ties **64**, and the core section extending between the cross tie **64** and the clip **86**, the core assembly may include one or more intermediate sections similar to the first mentioned core section, each adjacent pair of the core sections being conveniently spliced together at a cross tie **64**.

As shown, the resistor element assembly is U-shaped, each leg thereof being projected freely through aligned openings **76** in the discs **70**. Each of the aforesaid legs includes a coil section **90**, a coil section **92**, a bus bar **94** joining the coil sections **90** and **92**, and a terminal fitting **96**. The coil sections **90** respectively on opposite sides of the heater are joined by a transversely extending uncoiled section **98**. It will be understood that, as in the case of the core assembly, the resistor element assembly may include intermediate sections.

It should be evident that the modified form of the heater is somewhat more rigid than the first mentioned form of the heater, and that its core assembly is quite capable of controlling twisting of the core assembly about its central axis thereby to relieve the heater coils of stresses that would be induced by such twisting. This arrangement also provides a coil supporting bar sufficiently rigid to permit prestressing coils as necessary to prevent coil sag without developing undesirable curvature in the heater. Further one of the most desirable features of this modified form of the heater is that one heating element can be made up of a number of shorter semi-rigid independent sections for shipping and handling ease, which can very quickly and easily be assembled in the field to form one very long heater. In addition, it may be noted that considerable flexibility in the arrangement of the refractory elements upon the strap sections **60**, **62** and **82** is afforded. For example, upon a strap section **60** of a given length only a certain number of refractory elements may be mounted; however, the discs **70** and spacers **78** may be arranged in any desired order, without or with one or more spacers **78** between each pair of adjacent discs **70**.

In the modified form of the electric heater illustrated in FIGURES 14 and 15, the core comprises a pair of longitudinally extending laterally spaced strap members **100**, each having opposite end portions respectively fitted with clips **102**. Carried by the strap members **100** are a number of identical elongated ceramic members **104** having rectangular openings **106** extending respectively through opposite end portions thereof, and each having four round openings **108** equally spaced between the openings **106**, as shown. Also carried by the strap members **100** are a number of identical ceramic spacer members **110** of cylindrical shape and provided with rectangular central apertures **112**, as shown. The ceramic members **104** and the spacer members **110** are strung like beads upon the strap members **100**, with very little or no play between the successive ones thereof and secured against any substantial axial shifting movement by the clips **102**. As shown, the ceramic members **104** are arranged with one or more spacers **110** between each successive pair of members **104**.

As shown, the resistor element assembly is generally W-shaped, each leg thereof being in the form of a coil **114** projected freely through aligned openings **108** in the ceramic members **104**, and each adjacent pair of the legs **114** being joined by a transversely extending uncoiled section **116**. The extremities of the resistor element assembly are fitted respectively with terminals **118**.

It should be evident that this second modified form of the heater is somewhat flexible, being capable of bending out of the plane of the strap members **100**, and that its core assembly is quite capable of controlling twisting of the core assembly about its central axis thereby to relieve the heater coils of excessive stresses that could be induced by such twisting. In addition, the strap members **100** do not limit the possible arrangements of the ceramic members **104** and **110** upon the strap members **100**.

Furthermore the flexibility of this second modified form of the invention lends itself suitably for use in round radiant jackets, air heaters, pan type heaters, as well as other uses. If it becomes desirable to have rigidity in more than one plane, slots **112** in support **104** may be rotated in a fashion similar to that indicated on support **70** or additional slots with additional supporting strips **100** may be used for this purpose.

It will be understood, of course, that the present invention as hereinbefore described and as shown in the accompanying drawings is susceptible of various changes and modifications which may be made from time to time without departing from the general principles or real spirit of the invention, and accordingly, it is intended to claim the same broadly, as well as specifically, as indicated by the appended claims.

What is claimed is:

1. In an electric heater, the combination comprising a core assembly including a flexible flat strap member, an

assembly of insulator disc members having said strap member centrally projected freely therethrough and thereby secured against turning about the axis of said strap member, and means for securing said disc members in axially substantially spaced relation to one another and against shifting axially upon said strap member, and a heater element assembly including a plurality of flexible elongated heater elements each projected freely through corresponding marginal areas of certain of said disc members, said heater elements thereby being disposed substantially parallel to said elongated member and in laterally spaced relation to one another, and elongated flexible bus bar members respectively connected to the ends of said heater elements and extending in longitudinal continuation thereof, each of said bus bar members being projected freely through corresponding marginal areas of others of said disc members and extended beyond an end one of said disc members for connection to a source of electric power, and being fixed against shifting movement axially of said heater.

2. An electric heater as defined in claim 1 wherein the bus bar members are substantial in length and extend through a plurality of said disc members.

3. An electric heater as defined in claim 1 wherein the heating elements and bus bar members conjointly extend through substantially all of said disc members, and the connections of said heating elements to said bus bar members are effected between a pair of adjacent disc members.

4. In an electric heater, the combination comprising a core assembly including a flexible flat strap member, an assembly of insulator members slidably fitted over said flat strap member and thereby secured against turning thereabout, and means for securing said assembly of insulator members against shifting axially upon said flat strap member, said assembly including a plurality of disc and disc spacer members, at least one of said spacer members being interposed between each successive pair of disc members thereby to secure the latter in axially substantially spaced relation to one another, and a heater element assembly including a plurality of flexible elongated heater elements each projected freely through corresponding marginal areas of certain of said disc members, said heater elements thereby being disposed substantially parallel to said flat strap member and in laterally spaced relation to one another and to said disc spacer members, and elongated bus bar members respectively connected to the ends of said heater elements and extending in longitudinal continuation thereof, each of said bus bar members being projected freely through corresponding marginal areas of others of said disc members, and being extended beyond an end one of said disc members for connection to a source of electric power.

5. In an electric heater, the combination comprising a core assembly including a flexible flat strap member, an assembly of insulator members slidably fitted over said flat strap member and thereby secured against turning thereabout, and means for securing said assembly of insulator members against shifting axially upon said flat strap member, said assembly including a plurality of disc and disc spacer members, at least one of said spacer members being interposed between each successive pair of disc members thereby to secure the latter in axially substantially spaced relation to one another, and a heater element assembly including a plurality of flexible elongated heater elements each projected freely through corresponding marginal areas of certain of said disc members, said heater elements thereby being disposed substantially parallel to said flat strap member and in laterally spaced relation to one another and to said disc spacer members, and means connecting all of said heater elements in Y and providing three fully exposed terminals at one end of said heater to facilitate connection to a three phase power line.

6. An electric heater as defined in claim 4 wherein each branch of the Y comprises a plurality of heater elements connected in parallel.

7. In an electric heater, the combination comprising a core assembly including a pair of longitudinally extending flat strap members disposed in laterally spaced parallel relation, an assembly of insulator disc and disc spacer members having said strap members projected freely therethrough and being thereby secured against turning thereabout relative to one another, at least one of said spacer members being interposed between each successive pair of disc members thereby to secure the latter in axially substantially spaced relation to one another, and means for securing said assembly of insulator members against shifting axially upon said flat strap members including a flat strap cross tie joining said flat strap members at one end of said core assembly and abutment means at the opposite end of said core assembly, and a heater element assembly including a plurality of flexible elongated heater elements each projected freely through corresponding marginal areas of said disc members, said heater elements thereby being disposed substantially parallel to said flat strap members and bunched therewith about the central axis of said core assembly and in laterally spaced relation to one another and to said disc spacer members.

8. In an electric heater, the combination comprising a core assembly including a ladder-like framework having a pair of longitudinally extending flat strap members disposed in laterally spaced parallel relation, each of said members having a plurality of flat strap sections disposed in end-to-end relation, and intermediate cross ties joining together opposed pairs of the meeting ends of said flat strap sections, an assembly of insulator disc and disc spacer members having said strap members projected freely therethrough and being thereby secured against turning thereabout relative to one another, at least one of said spacer members being interposed between each successive pair of disc members thereby to secure the latter in axially substantially spaced relation to one another, and means for securing said assembly of insulator members against shifting axially upon said flat strap members including a flat strap cross tie joining said flat strap members at one end of said core assembly and abutment means at the opposite end of said core assembly, and a heater element assembly including a plurality of flexible elongated heater elements each projected freely through corresponding marginal areas of said disc members, said heater elements thereby being disposed substantially parallel to said flat strap members and bunched therewith about the central axis of said core assembly and in laterally spaced relation to one another and to said disc spacer members.

9. In an electric heater, the combination comprising a core assembly including a ladder-like framework having a pair of longitudinally extending flat strap members disposed in laterally spaced parallel relation, each of said members having a plurality of flat strap sections disposed in end-to-end relation, and intermediate cross tie joining together opposed pairs of the meeting ends of said flat strap sections, an assembly of insulator disc and disc spacer members having said strap members projected freely therethrough and being thereby secured against turning thereabout relative to one another, at least one of said spacer members being interposed between each successive pair of disc members thereby to secure the latter in axially substantially spaced relation to one another, and means for securing said assembly of insulator members against shifting axially upon said flat strap members including a flat strap cross tie joining said flat strap members at one end of said core assembly and abutment means at the opposite end of said core assembly, and a heater element assembly including a plurality of flexible elongated heater elements each having a plurality of sections, and bus bars connect said sections, each of said heater elements being projected freely

through corresponding marginal areas of said disc members, said heater elements thereby being disposed substantially parallel to said flat strap members and bunched therewith about the central axis of said core assembly and in laterally spaced relation to one another and to said disc spacer members with said bus bars at locations corresponding to those of the intermediate cross ties.

10. In an electric heater, the combination comprising a core assembly including at elast one elongated flexible flat strap member, an assembly of insulator disc members having said strap member projected freely therethrough and thereby secured against turning about the axis of said strap member, and means for securing said disc members in axially substantially spaced relation to one another and against shifting axially upon said strap member, and a heater element assembly including at least one flexible elongated heater element projected freely through corresponding marginal areas of certain of said disc members, said heater element thereby being disposed substantially parallel to said elongated member, and elongated flexible connecting members respectively connected to the ends of said heater element and extending in longitudinal continuation thereof, each of said connecting members being projected freely through corresponding marginal areas of others of said disc members and extending beyond an end one of said disc members for connection to a source of electric power and being fixed against shifting movement axially of said heater.

11. The combination claimed in claim 10 wherein said disc members are apertured for a close sliding fit over said strap member and thereby secured against turning about said axis.

12. The combination as claimed in claim 10 wherein said means for securing said disc members in axially substantially spaced relation to one another comprises a plurality of removable spacers.

13. The combination as claimed in claim 12 wherein the transverse dimension of said spacers is less than that of said disc members.

14. The combination as claimed in claim 10 including more than one, laterally spaced strap members.

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