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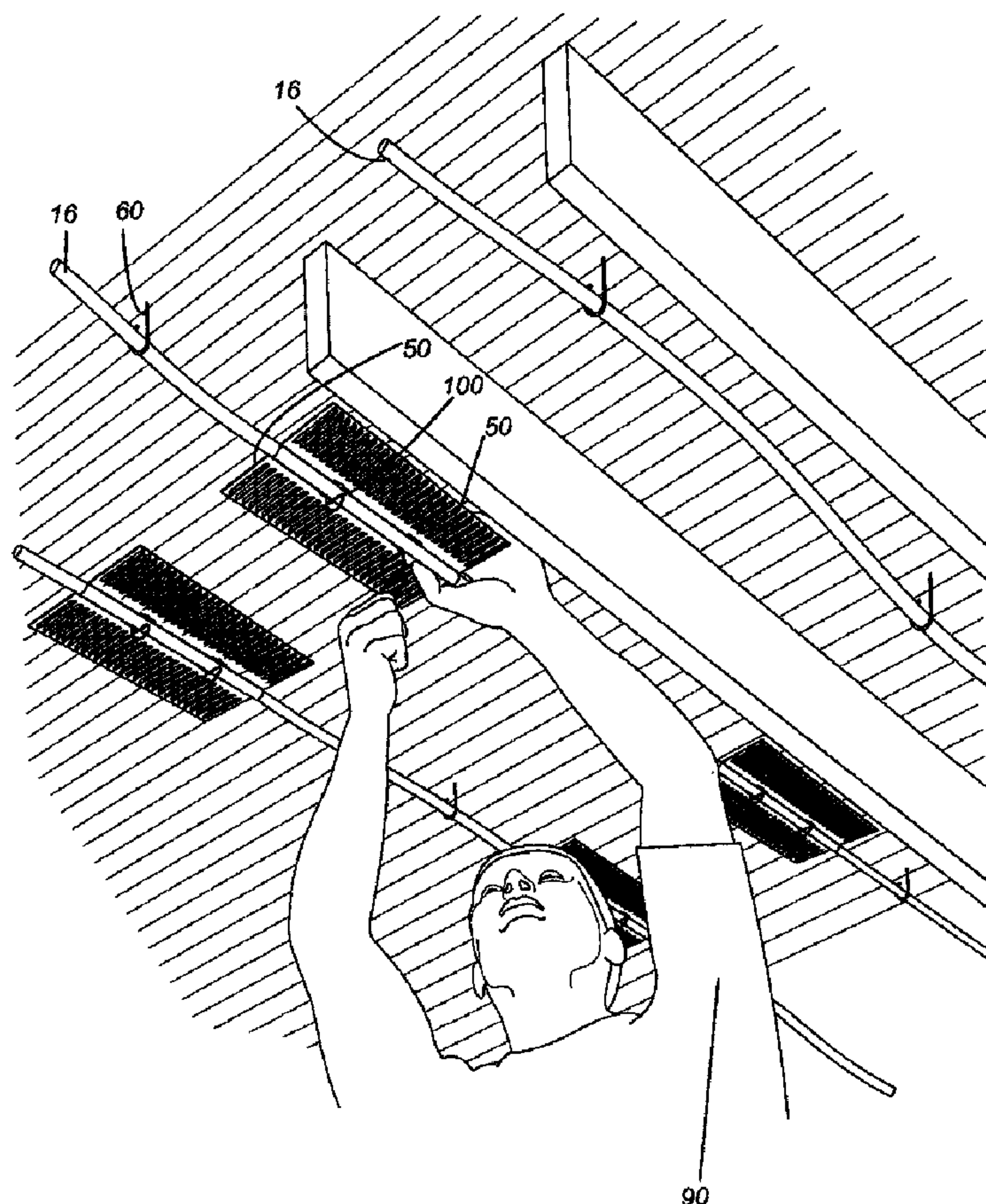
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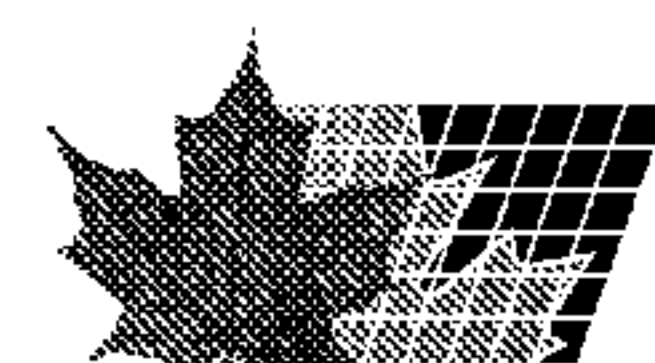
(54) Titre : AILETTES POUR UN CABLE ELECTRIQUE DANS UN SYSTEME DE CHAUFFAGE RADIATIF ELECTRIQUE

(54) Title: FINS FOR AN ELECTRIC CABLE IN AN ELECTRIC RADIANT HEATING SYSTEM



(57) Abrégé/Abstract:

A heat-transferring fin is attached to an electric cable or to a packaged double cable of an electric radiant heating system. The fins can be attached using twist clips. Each twist clip includes an upper gripping member, a lower gripping member connected to the



(57) **Abrégé(suite)/Abstract(continued):**

upper member by an upright support member, and a handle portion looping downwardly from the lower gripping member to enable a user to hold the clip and to manually twist the clip to cause the upper and lower gripping members to rotate relative to the fin and cable such that the fin and cable are clipped together. This twist clip enables quick and easy attachment of fins to cables, which greatly reduces the time and effort required to install an electric radiant heating system. This technology can be used in electric radiant floor heating or electric radiant wall heating.

ABSTRACT

A heat-transferring fin is attached to an electric cable or to a packaged double cable of an electric radiant heating system. The fins can be attached using twist clips. Each twist clip includes an upper gripping member, a lower gripping member connected to the upper member by an upright support member, and a handle portion looping downwardly from the lower gripping member to enable a user to hold the clip and to manually twist the clip to cause the upper and lower gripping members to rotate relative to the fin and cable such that the fin and cable are clipped together. This twist clip enables quick and easy attachment of fins to cables, which greatly reduces the time and effort required to install an electric radiant heating system. This technology can be used in electric radiant floor heating or electric radiant wall heating.

FINS FOR AN ELECTRIC CABLE IN AN ELECTRIC RADIANT HEATING SYSTEM

TECHNICAL FIELD

5 The present invention relates generally to heating systems and, in particular, to electric radiant heating systems.

BACKGROUND

10 Electric radiant heating systems for heating floors (radiant floor heating) or walls (radiant wall heating) are well known in the art. In such a system, an electric current flows through a resistive wire inside a heating cable that is disposed in a circuit in the floor or ceiling. Heat is transferred from the electric cable to the adjacent floor or ceiling to thereby heat the floor or ceiling. Typically, a thermostat is provided to control the amount of current that flows through the wire of the heating cable and thus the amount of heat that is generated by the cable. The heating cable can be a single cable, a
15 packaged double cable or a cable (a mesh of cables attached to typically a nylon mesh).

Although these radiant heating systems are known, improvements and refinements remains highly desirable, particularly in terms of ease of installation of efficiency of heat transfer.

SUMMARY OF THE INVENTION

20 In general, the present invention provides an electric radiant heating system in which one or more heat-transferring fins are attached to an electric heating cable to promote heat transfer to an adjacent surface to be warmed, such as a floor. The present invention also provides, in general, a method of installing an electric radiant heating
25 system which involves attaching these fins to the electric cable. In one embodiment, as will be elaborated below, this technology involves the use of specially designed twist clips that can be inserted through slots in the fins for quick and easy installation.

In accordance with one aspect of the present invention, an electric radiant heating system has an electric cable spaced apart from a surface to be warmed, and a heat-

transferring fin connected to the electric cable to transfer heat from the electric cable to the surface to be warmed. In one particular embodiment of this system, twist clips are used to affix the heat-transferring fins to the cable by inserting these twist clips through slots in the fins and twisting (rotating) each of the twist clips to clip the fins to the cable.

- 5 In accordance with another aspect of the present invention, a method of installing an electric radiant heating system involves steps of selecting a length of electric cable suitable for heating a surface, disposing the electric cable a distance apart from the surface to be warmed, and attaching at least one heat-transferring fin to the electric cable. In one particular embodiment of this method, the fins are attached to the cable
10 using twist clips that are inserted through slots in the fins.

- In accordance with yet another aspect of the present invention, a radiant heating system has a length of electric cable for generating heat and first and second heat-transferring fins attached side by side to the cable by first and second twist clips. Each clip has an upper gripping member, a lower gripping member connected to the upper member by
15 an upright support member, and a handle portion looping downwardly from the lower gripping member to enable a user to hold the clip and to manually twist the clip to cause the upper and lower gripping members to rotate relative to the fin and cable such that the fin and cable are clipped together.

- In accordance with a further aspect of the present invention, a heat-transferring fin for
20 attachment to an electric cable has an elongated trough for fitting over or under the outer surface of the cable and a substantially flat surface extending outwardly from the trough. The surface comprises a plurality of parallel elongated apertures and at least one elongated slot through which a twist clip can be inserted, the at least one slot being formed in the flat surface between the parallel elongated apertures and the trough. The
25 at least one slot is arranged parallel to the trough and orthogonal to the parallel elongated apertures.

The new technology described herein provides a simple, efficient, and cost-effective system and method for delivering radiant heat to a surface to be warmed such as a floor or wall.

BRIEF DESCRIPTION OF THE DRAWINGS

Further features and advantages of the present invention will become apparent from the following detailed description, taken in combination with the appended drawings, in
5 which:

FIG. 1A is a plan view of an electric heating system having heat-transferring fins attached to the heating cable in accordance with an embodiment of the present invention;

10 FIG. 1B is a plan view of an electric heating system having heat-transferring fins attached to the heating cable in accordance with another embodiment of the present invention;

FIG. 2 is a perspective view of a user installing heat-transferring fins to a heating cable
15 using twist clips in accordance with an embodiment of the present invention;

FIG. 3 is an exploded view of a segment of an electric heating cable, a pair of fins and a pair of twist clips used to attach the fins to the cable, showing in particular the alignment of the clips with respect to elongated slots in the fins;
20

FIG. 4 is a perspective view of the cable and fins, showing how a twist clip is rotated to clip the fins to the cable;

FIG. 5 is a perspective view of a pair of fins attached to a cable by a pair of twist clips
25 that have been twisted into their operative position perpendicular to the cable; and

FIG. 6 is a side elevation view of a twist clip for connecting fins to an electric cable;

FIG. 7 is a perspective view of a variant of the heat-transferring fins that is designed with a wider and flatter trough for fitting over the oblong outer surface of a packaged
30 double cable; and

FIG. 8 is a front elevation view of the fins of FIG. 7 attached to a packaged double cable.

It should be noted that throughout the appended drawings, like features are identified by like reference numerals. The drawings are not necessarily to scale.

DETAILED DESCRIPTION OF EMBODIMENTS

In general, and as will be elaborated below, the present invention provides novel electric radiant heating system in which heat-transferring fins are attached to an electric heating cable to promote radiation heat transfer to a surface to be warmed, such as, for example, a floor or wall. Also provided herein is a method for installing these fins to the cable. As will be elaborated below, in one main embodiment of this heating system and its related installation method, the fins are attached to the cable using a special twist clip. The twist clip is designed for attaching one or more heat-transferring fins to a heating cable. The twist clip can be made by bending a metal wire so that it has an upper gripping member with a flared end for being urged over the top of the cable and a lower gripping member for being urged under the cable. The lower gripping member loops downwardly to form a handle portion that enables a user to twist the clip. Using this twist clip, fins can be quickly and easily connected to cables. The twist clip is inserted upwardly through a slot in the fin and then twisted approximately ninety degrees about a vertical axis so that the upper and lower members rotate over and under the cable, respectively, so as to secure the fins to the cable. The fins can be removed by reversing this two-step installation procedure, that is, by twisting the clip ninety degrees and then extracting it downwardly through the slot in the fin to thereby release the fin from the cable.

Embodiments of this invention will now be described in greater detail below, with reference to the accompanying figures.

FIG. 1A is a schematic plan view of an electric radiant heating system, generally designated by reference numeral 10, in accordance with an embodiment of the invention. The electric radiant heating system 10 depicted in FIG. 1A transfers radiant

heat from an electric cable 16 that enshrouds a copper wire or other resistive wire. The resistive wire within the electric cable 16 is supplied with an electric current from an electric power supply 12 (either hardwired or plugged into an electrical outlet or socket). The amount of heating can be regulated or controlled by a thermostat 14 disposed in
5 the circuit, as shown in FIG. 1A. The power supply 12 can be 120 V, 240 V or any other desired voltage.

The heating cable 16 of the electric radiant heating system 10 may optionally be disposed (e.g. suspended) parallel to the floor joists as depicted in FIG. 1A or, alternatively, the cable may be arranged (e.g. suspended) transversely to the floor joist
10 by drilling holes in the floor joists. In the former case, as shown in FIG. 1A, the cable 16 loops back and forth under a floor 42 of a zone 40 of a dwelling and runs between and generally parallel to the floor joists 44. In other words, the cable 16 passes through the “inter-joist spaces” beneath the floor 42. To set up the system shown in FIG. 1A, the cable is pulled through holes 46 drilled in ends of the joists 44 to enable the cable to be
15 extended into an adjacent inter-joist space.

In any event, whether the cable is disposed generally longitudinally or generally transversely to the joists, the cable can be disposed in a generally serpentine circuit to provide coverage for the surface to be warmed (in this example, the floor 42). As shown, the cable 16 loops back to the thermostat 14 and power supply 12 to form a
20 closed circuit (such as the one shown in FIG. 1A) for heating one surface or zone 40 of the dwelling or building. Alternatively, the cable 16 can be extended into other zones 40 in a single serial configuration, or alternatively a plurality of parallel circuits can be connected to the same power supply 12 and thermostat 14. In another variant, more than one thermostat can be provided to control each circuit where a separate circuit is
25 used for each zone of the dwelling. Each of these circuits can be connected to different power supplies as desired.

In an alternative embodiment, as shown in FIG. 1B, a two-wire cable can be strung under a floor. In this embodiment, the cable need not be looped back to form a closed loop since the wires themselves loop back to form the closed circuit.

A plurality of heat-transferring fins 50 (or fin assemblies having two or more fins or fin halves) which promote heat transfer from the cable 16, are connected to the cable 16 at intervals, as described in U.S. Patent Serial No. 5,542,603 (James MacDuff) entitled HYDRONIC HEATING SYSTEM. Heat from the resistive wire(s) within the cable is conducted to the fins. The heat is then convected upwardly to the floor where it then radiates into the room above.

As shown in FIG. 1A and in FIG. 1B, the electric radiant heating system 10 further includes a plurality of hangers 60 as described in U.S. Patent Application Serial No. 2007/0095931 (MacDuff) entitled AN ELECTRIC HEATING SYSTEM, HANGER FOR TUBING AND METHOD OF USING SAME TO INSTALL THE ELECTRIC HEATING SYSTEM. The hangers 60 suspend the electric cable 16 a predetermined distance beneath an underside of the floor 42 in order to provide uniform convective heat transfer to the floor 42 and to thus preclude the creation of any unwanted hot spots on the floor 42. It should be expressly understood that the distribution and spacing of the hangers 60 or the heat-transferring fins 50, or fin assemblies 50, shown schematically in FIG. 1A and in FIG. 1B are not intended to reflect a distribution and spacing that would actually be used to suspend the tubing. The actual spacing to be used will depend on the type of cable (i.e. to prevent sagging of the cable).

Although FIG. 1A and FIG. 1B illustrate an electric radiant heating system applied to a floor supported by floor joists through which holes may be bored, the electric radiant heating system is equally adapted to be used with floors constructed with open or "space joist" systems, well known in the art, stressed-skin panels, reinforced concrete, or any other flooring system that presents a relatively flat floor underside into which fasteners can be driven to suspend the tubing.

FIGS. 2-6 illustrate a twist clip 100 for quickly and easily attaching fins to an electric cable in accordance with an embodiment of the present invention. These twist clips 100 are specially designed for attaching one or more heat-transferring fins 50 to a cable 16. As shown in FIG. 2, a user (or installer) 90 attaches the fins 50 to the cable 16 between

the joists 44 at regular intervals along the length of the cable 16. The cable 16 is suspended by hangers 60, also spaced at regular intervals between the joists 44 along the length of the cable 16. As shown in FIG. 2, it is preferable to attach the fins 50 to the cable 16 using two twist clips 100 per fin 50 (or per pair of side-by-side fins 50), as will
5 be elaborated below.

As shown in FIG. 3, two fins 50 are preferably attached side by side to the cable 16 to constitute a "fin assembly". For the purposes of this specification, the expression "fin" shall be construed as encompassing either a solitary fin or a fin assembly having two (or more) fins assembled together. In the particular embodiment shown in FIG. 3, the fin 50
10 is effectively a fin half, i.e. it is designed to be connected to the cable in a side-by-side configuration with another symmetrical fin to constitute a complete fin (or fin assembly). Thus, the fin 50 shown in FIG. 3 has only a single surface 52 that extends from one side of the cable 16. The surface 52 is a thin and wide surface, which is preferably made of aluminum or other metal. The surface 52 has a plurality of parallel apertures 54, which
15 are preferably slots transverse to the cable 16, as illustrated in the figures.

As shown in FIG. 3, the fin 50 includes a curved elongated trough 56 disposed longitudinally along one side 57 of the fin 50. The elongated trough 56 is sized and shaped to fit an outside surface of the cable 16. In one embodiment, the curved trough 56 is a cylindrical half shell having a radius of curvature equal to that of the cable 16. in
20 another embodiment (shown in FIGS. 7 and 8), the elongated trough comprises curved ends and a substantially flat middle portion for fitting over or under an oblong outer surface of a packaged double cable to thereby conduct heat from the double cable to the heat-transferring fins.

As depicted in FIG. 3, the fins 50 are preferably identical (which greatly simplifies manufacturing and shipping) and are installed such that one of the fins 50 has its trough 56 facing up while the other fin 50 has its trough 56 facing down. When the fins 50 are attached side by side to the cable 16 (or to a packaged double cable), the two troughs 56 substantially surround the cable 16 such that the clips 100 only contact the troughs
25

56, thereby clamping or sandwiching the cable 16 between the troughs 56. Since the troughs fully encircle the cable, maximum conductive heat transfer is obtained.

As shown in FIG. 3, the fin 50 further includes at least one slot 58 disposed between the trough 56 and the parallel apertures 54 through which the clip 100 is inserted. The slot 58 includes a notch 59 for restraining the clip 100 when the clip 100 is twisted into an operative position perpendicular to the cable 16. The notch 59 is preferably semicircular with a diameter equal to a diameter of the upright support member 106. Operation of the notch will be described in greater detail below.

Although the fin 50 shown in FIG. 3 represents one example of the design, in an alternative embodiment the fin could be a single (i.e. integral) piece having surfaces extending on both sides of the cable. In this alternative embodiment, the double-sided fin 50 would be placed beneath or on top of the cable, thus leaving either the top or the underside of the cable exposed such that one part of the clip would directly contact the cable (whereas, in the arrangement involving two separate fins, the clip does not directly contact the cable).

Furthermore, it should be understood that the size, dimensions, and shape of the fin and its apertures can be varied for specific applications or simply as a result of optimization. For example, the fins need not be rectangular, nor do the apertures have to be arranged transversely.

As further depicted in FIG. 3, the fins 50 are attached to the cable 16 using a pair of twist clips 100 (although it should be appreciated that in other variants, only a single twist clip could be used or, alternatively, three or more twist clips could be used). The clips, or "keys", are used to clip, or "lock", the fins to the cable.

As illustrated in FIGS. 3-6, each twist clip 100 is designed to enable the user/installer to quickly and easily attach the heat-transferring fin(s) 50 to the cable 16 of an electric radiant heating system 10. In accordance with the embodiment shown in FIGS. 3-6, each clip 100 has an upper gripping member 102, a lower gripping member 104 connected to the upper member 102 by an upright support member 106. The clip 100

also has a handle portion 108 looping downwardly from the lower gripping member 104 to enable the user to hold the clip 100 and to manually twist the clip as shown in FIG. 4) to cause the upper and lower gripping members 102, 104 to rotate relative to the fin 50 and cable 16 such that the fin 50 and cable 16 are clipped together (as shown in FIG. 5).

The upper gripping member 102, lower gripping member 104, upright support member 106 and handle portion 108 can be integrally formed from a single length of metal wire. The metal wire can be readily bent using known metal bending instruments to form the clip, thus providing a simple and inexpensive means of manufacturing the clip. In one embodiment, the metal wire has a diameter of about 2 mm (although this diameter can be varied for different applications).

In the embodiment of the twist clip shown in FIG. 6, the upper gripping member 102 and the lower gripping member 104 converge (slightly) in a direction away from the upright support member 106 (designated by arrow 105). As shown in FIG. 6, the angle of convergence X is quite shallow such when the clip 100 is urged over the cable 16, the upper and lower members 102, 104 of the clip 100 will spread out. Being elastically deformed, the upper and lower members 102, 104 of the clip 100 are biased back toward the slightly converged posture, thus providing a small gripping force on the cable 16. In the embodiment shown in FIG. 6, the upper gripping member 102 can have an outwardly flared end 103 to facilitate placement of the clip 100 onto the cable 16. As further shown in FIG. 6, between the upper gripping member 102 and the lower gripping member 104 is a gap G that is preferably less than an outer diameter of the cable 16. Having a gap G smaller than the cable diameter further ensures that the clip snugly grips the fin to the cable.

As shown in FIGS. 3-6, the handle portion 108 loops from the lower gripping member 104 back into close proximity with a point 105 where the lower gripping member 104 connects to (or "becomes" in the case of a unitary metal wire clip) the upright support member 106. The handle portion 108 could be formed or bent differently to provide a handle for the user. The illustrated handle portion 108 represents the preferred design

for this twist clip because it is simple to manufacture (easy to bend into that shape), uses a minimal amount of wire, and is structurally rigid enough to enable the user to hold and twist the clip without causing any discomfort to the user or without causing the clip itself to deflect undesirably.

- 5 The present invention also provides a method of installing an electric radiant heating system having heat-transferring fins. This method can be performed by attaching the heat-transferring fins to a cable of an electric heating system using twist clips. This method will now be described with reference to FIGS. 2-5. As shown in FIG. 2, the method can be used to attach one or more fins to an electric cable that is suspended by
10 hangers between joists of a floor to be radiantly heated.

As shown in FIG. 3, the method includes a step of aligning the upper gripping member 102 of each twist clip 100 with the slot 58 in the fin 50. As noted above, the slot 58 is parallel to the cable 16. As suggested by the large arrows in FIG. 3, a subsequent step of the method involves the user inserting the upper gripping member 102 of the twist
15 clip 100 upwardly through the slot 58 in the fin 50 until the lower gripping member 104 connected to the upper gripping member 102 by the upright support member 106 is approximately level with a bottom of the cable 16. As shown in FIG. 4, a subsequent step of the method entails the user twisting the clip 100 (as indicated by the large curved arrow in FIG. 4) until the upper and lower gripping members 102, 104 are
20 perpendicular to the cable 16 to thereby urge the upper gripping member 102 over a top of the cable 16 and the lower gripping member 104 under a bottom of the cable 16 such that the fin 50 and cable 16 are clipped together. FIG. 5 shows the end result of the method, i.e. two twist clips 100 holding a pair of fins 50 in the operative position perpendicular to the cable 16.

- 25 In one embodiment of this method, the clip 100 is twisted or rotated until the upright support member 106 engages the semicircular notch 59 in the slot 58. As was mentioned above, the diameter of the notch 59 is equal to, or slightly larger than, the diameter of the upright support member 106 so that the upright support member 106

catches in the notch 59, thus locking the clip 100 in the operative position perpendicular to the cable 16.

This method can be applied for attaching a single clip, or preferably, for attaching two clips as shown in the accompanying figures. Therefore, when two clips are to attached, the method can be summarized as follows: (i) placing the curved trough of the first fin on the top of the cable so that the first fin extends outwardly from a first side of the cable; (ii) placing the curved trough of the second fin on the bottom of the cable so that the second fin extends outwardly from a second side of the cable; (iii) aligning and inserting the first twist clip with the slot in the first fin and then twisting the first clip to fix the first fin to the cable; and (iv) aligning and inserting the second twist clip with the slot in the second fin and then twisting the second clip to fix the second fin to the cable.

As mentioned above, FIG. 7 and FIG. 8 depict a variant of the fin that is designed to be fitted over (or under) a packaged double cable (i.e. a twin cable package that has an outer sheath for enshrouding the two inner cables). In this variant, the fin has an elongated and widened trough 56a with curved ends 56b and a substantially flat middle 56c portion. This shape is designed to be fitted over or under an oblong outer surface of a packaged double cable to thereby conduct heat from the double cable to the heat-transferring fins. When the two fins (or fin halves) are assembled over the cable, the cable is fully surrounded. Seen from the front, as shown in FIG. 8, the two fin halves come together to form an oblong enclosure that fully enshrouds the double cable for optimal heat transfer.

Various modifications of form, arrangement of components, steps, details and order of operations of the embodiments illustrated, as well as other embodiments of the invention, will be apparent to persons skilled in the art upon reference to this description. It is therefore contemplated that the appended claims will cover such modifications and embodiments as fall within the true scope of the invention as set forth in the claims. In the specification including the claims, any numeric ranges are inclusive of the numbers defining the range. Citation of references herein shall not be construed as an admission that such references are prior art to the present invention. Accordingly, the embodiments

of the invention described above are intended to be exemplary only. The scope of the invention is therefore intended to be limited solely by the appended claims.

CLAIMS

1. An electric radiant heating system comprising:
 - a twin cable package having a pair of packaged electric cables spaced apart
 - 5 from a surface to be warmed; and
 - a pair of side-by-side detachably mounted heat-transferring fins that are attached to the twin cable package by twist clips that are inserted through slots in the fins and then twisted to clip the fins to the pair of packaged electric cables.
- 10 2. The electric radiant heating system as claimed in claim 1 wherein each fin has an elongated and widened trough with curved ends and a substantially flat middle portion designed to be fitted over or under an oblong outer surface of the twin cable package to thereby conduct heat from the twin cable package to the heat-transferring fins.
- 15 3. The electric radiant heating system as claimed in claim 2 wherein one of the pair of side-by-side fins is attached over the twin cable package while the other of the pair of side-by-side fins is attached under the twin cable package cable.
- 20 4. The electric radiant heating system as claimed in claim 3 wherein the twist clip comprises:
 - an upper gripping member;
 - a lower gripping member connected to the upper member by an upright support member; and
 - a handle portion looping downwardly from the lower gripping member to enable a
 - 25 user to hold the clip and to manually twist the clip to cause the upper and lower gripping members to rotate relative to the fin and twin cable package such that the fin and twin cable package are clipped together.

5. A method of installing an electric radiant heating system, the method comprising steps of:

providing a twin cable package having a pair of packaged electric cables;

5 disposing the twin cable package a distance apart from the surface to be warmed; and

attaching at least one heat-transferring fin to the twin cable package by:

aligning an upper gripping member of a twist clip with a slot in a fin, wherein the slot is substantially parallel to the twin cable package;

10 inserting the upper gripping member of the twist clip upwardly through the slot in the fin until a lower gripping member connected to the upper gripping member by an upright support member is approximately level with a bottom of the twin cable package; and

15 twisting the clip until the upper and lower gripping members are perpendicular to the twin cable package to thereby urge the upper gripping member over a top of the twin cable package and the lower gripping member under a bottom of the twin cable package such that the fin and twin cable package are clipped together.

20 6. The method as claimed in claim 5 wherein the step of twisting the clip comprises rotating the clip until the upright support member engages a semicircular notch in the slot, the notch having a diameter equal to a diameter of the upright support member.

7. The method as claimed in claim 5 further comprising a prior step of
25 manufacturing the twist clip by bending a single length of metal wire.

8. The method as claimed in claim 5 comprising steps of:

placing a curved trough of a first fin on a top of the twin cable package so that the first fin extends outwardly from a first side of the twin cable package;

placing a curved trough of a second fin on a bottom of the twin cable package so that the second fin extends outwardly from a second side of the twin cable package;

5 aligning and inserting a first twist clip with a slot in the first fin and then twisting the first clip to fix the first fin to the twin cable package; and

aligning and inserting a second twist clip with a slot in the second fin and then twisting the second clip to fix the second fin to the twin cable package.

10 9. A radiant heating system comprising:

a length of twin cable package having a pair of packaged electric cables for generating heat; and

first and second heat-transferring fins attached side by side to the twin cable package by first and second twist clips, each clip having:

15 an upper gripping member;

a lower gripping member connected to the upper member by an upright support member; and

a handle portion looping downwardly from the lower gripping member to enable a user to hold the clip and to manually twist the clip to cause the upper and lower gripping members to rotate relative to the fin and the twin cable package such that the fin and the twin cable package are clipped together.

20 10. The heating system as claimed in claim 9 wherein the upper gripping member, lower gripping member, upright support member and handle portion are integrally formed from a single length of metal wire.

11. The heating system as claimed in claim 9 wherein the upper gripping member and the lower gripping member converge in a direction away from the upright support

member, the upper gripping member having an outwardly flared end to facilitate placement of the clip onto the twin cable package.

5 12. The heating system as claimed in claim 9 wherein the handle portion loops from the lower gripping member back to into close proximity with a point where the lower gripping member connects to the upright support member.

10 13. The heating system as claimed in claim 9 wherein the first and second fins include curved troughs for engaging, respectively, a top and a bottom of the twin cable package, such that:

the upper gripping member fixes the curved trough of the first fin to the top of the twin cable package; and

the lower gripping member fixes the curved trough of the second fin to the bottom of the twin cable package.

15 14. The heating system as claimed in claim 9 wherein each of the fins comprises a generally rectangular body having a plurality of parallel apertures, a curved trough disposed longitudinally along one side of the fin, the trough being sized and shaped to fit an outside surface of the twin cable package, each fin further comprising at least one
20 slot disposed between the trough and the parallel apertures for receiving a clip, the slot having a notch for restraining the clip when the clip is twisted into an operative position perpendicular to the twin cable package.

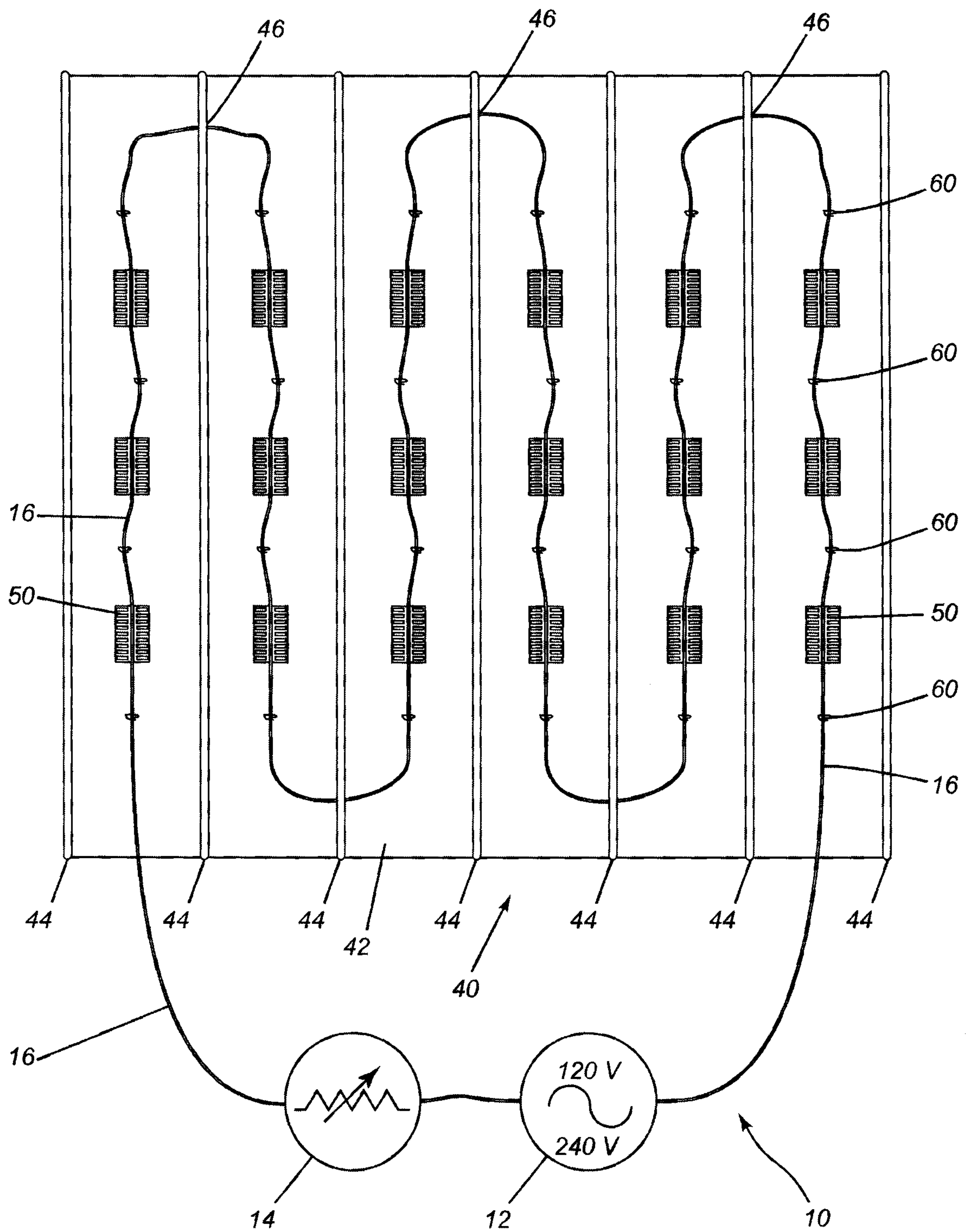


FIG. 1A

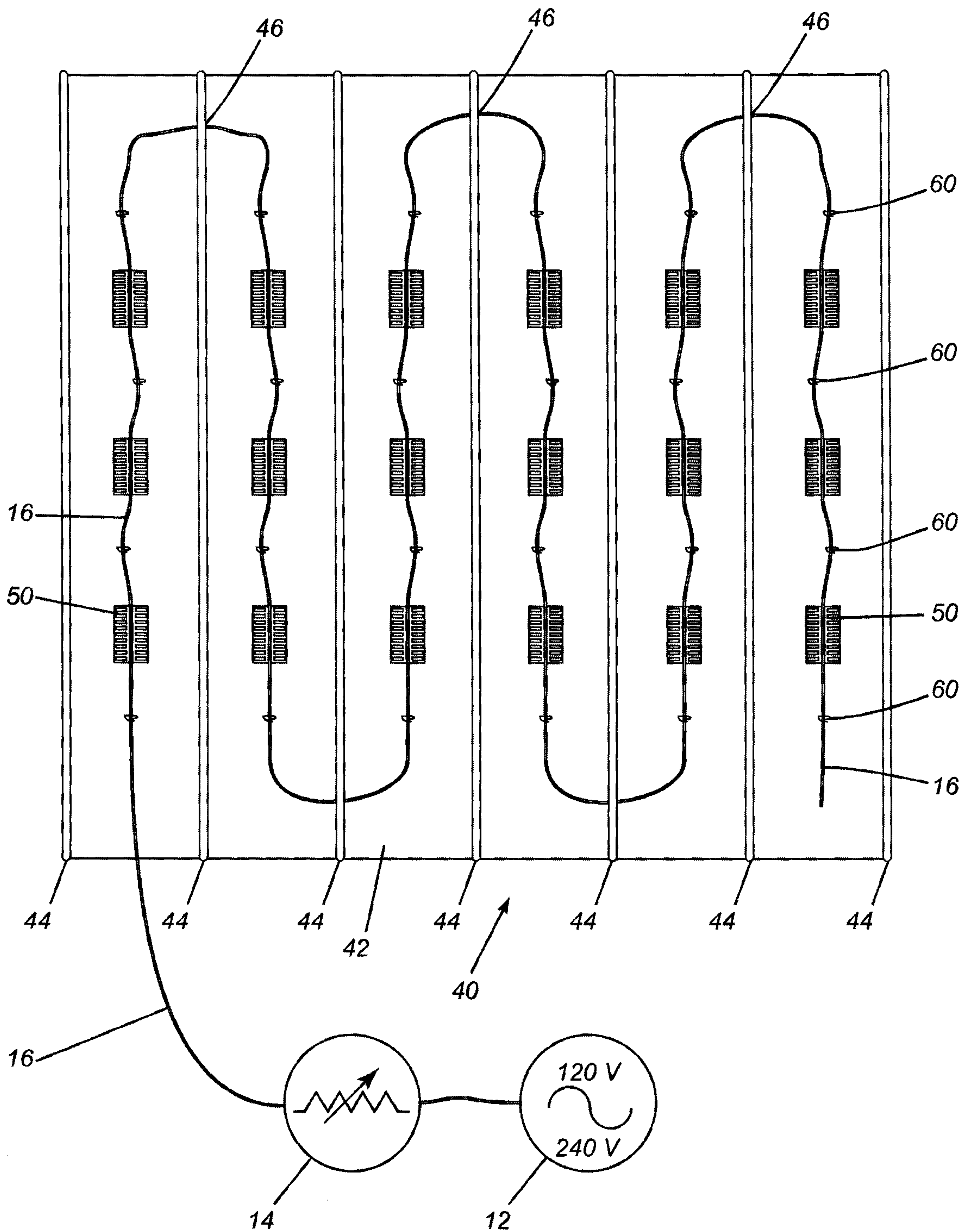


FIG. 1B

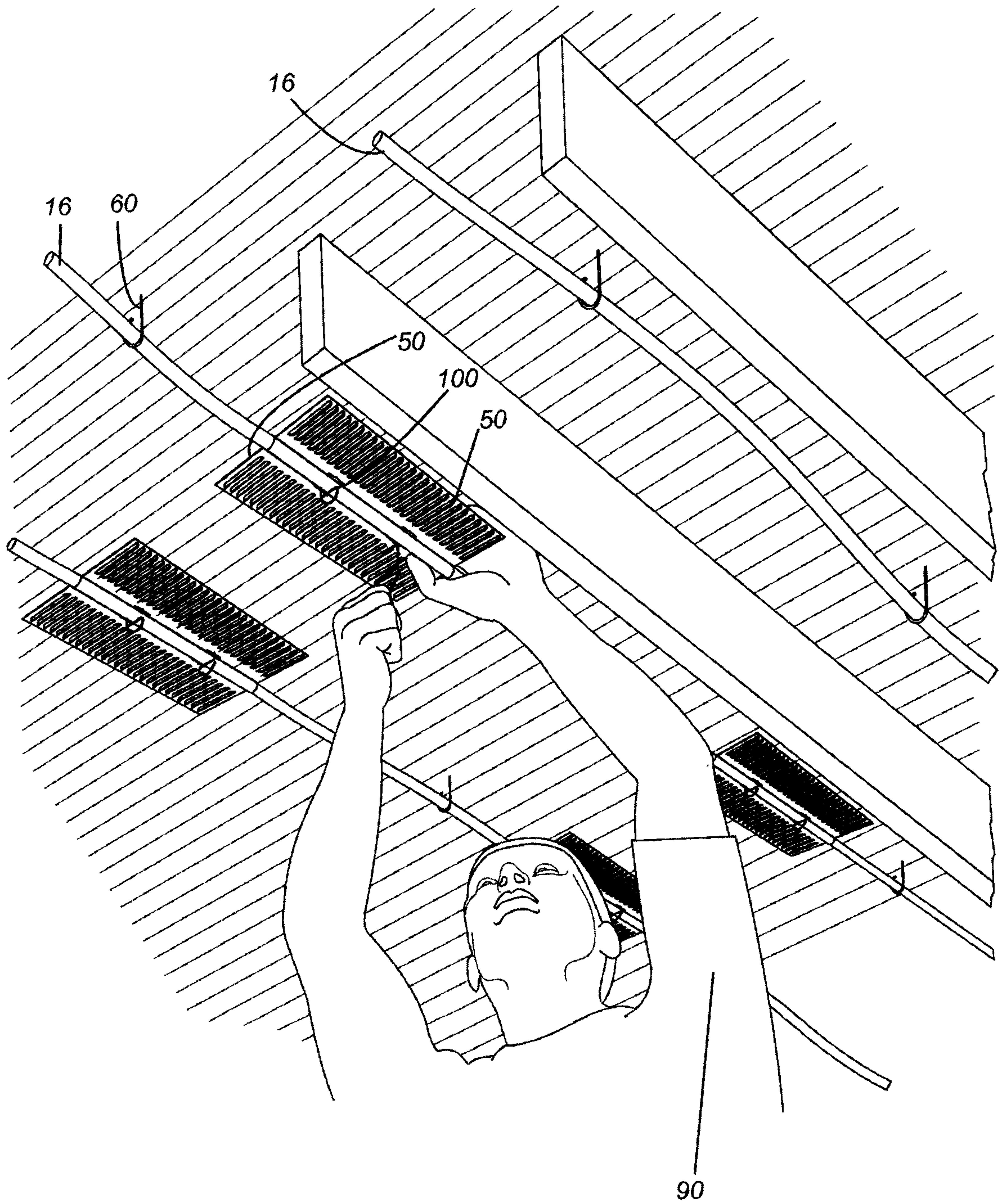
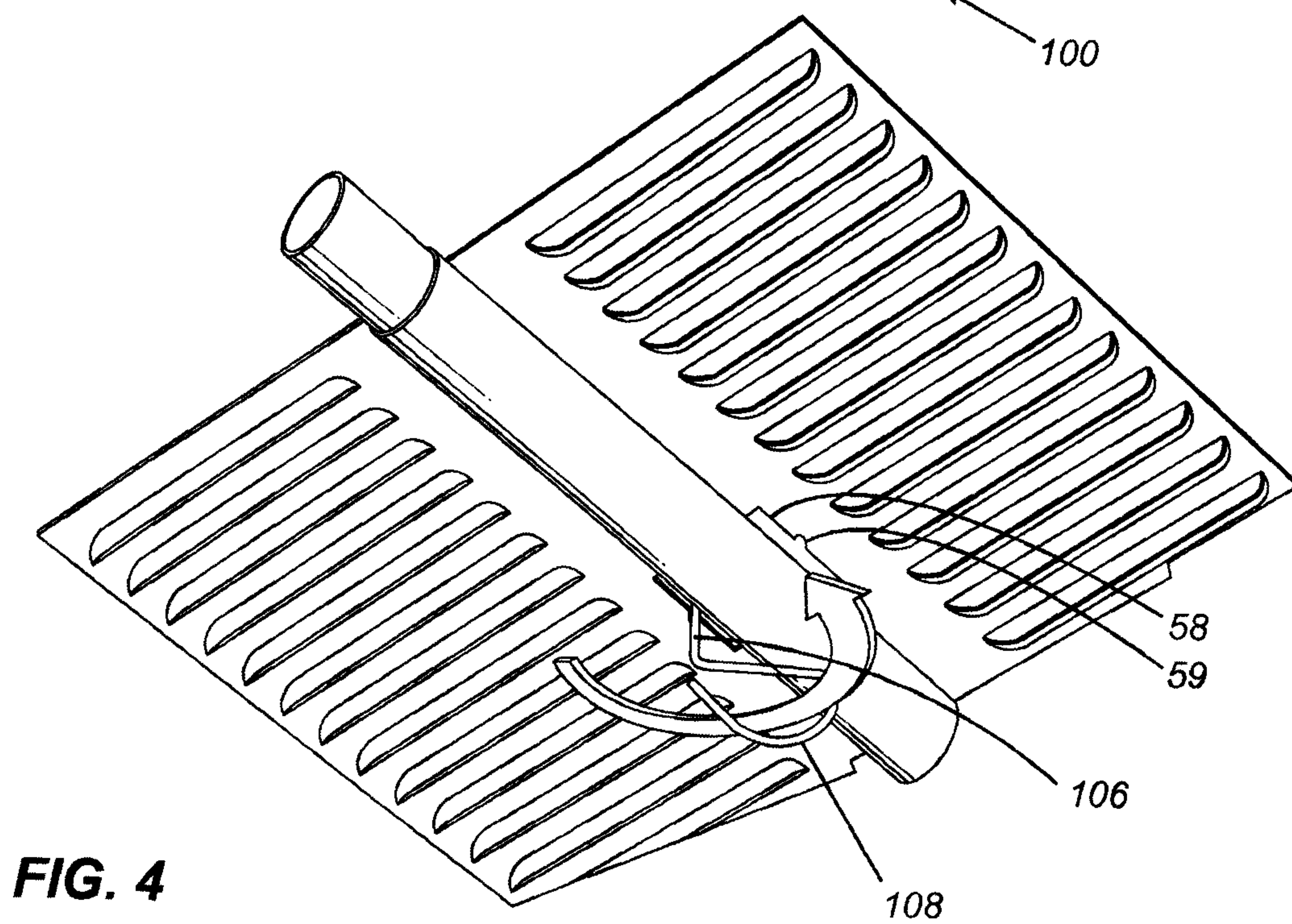
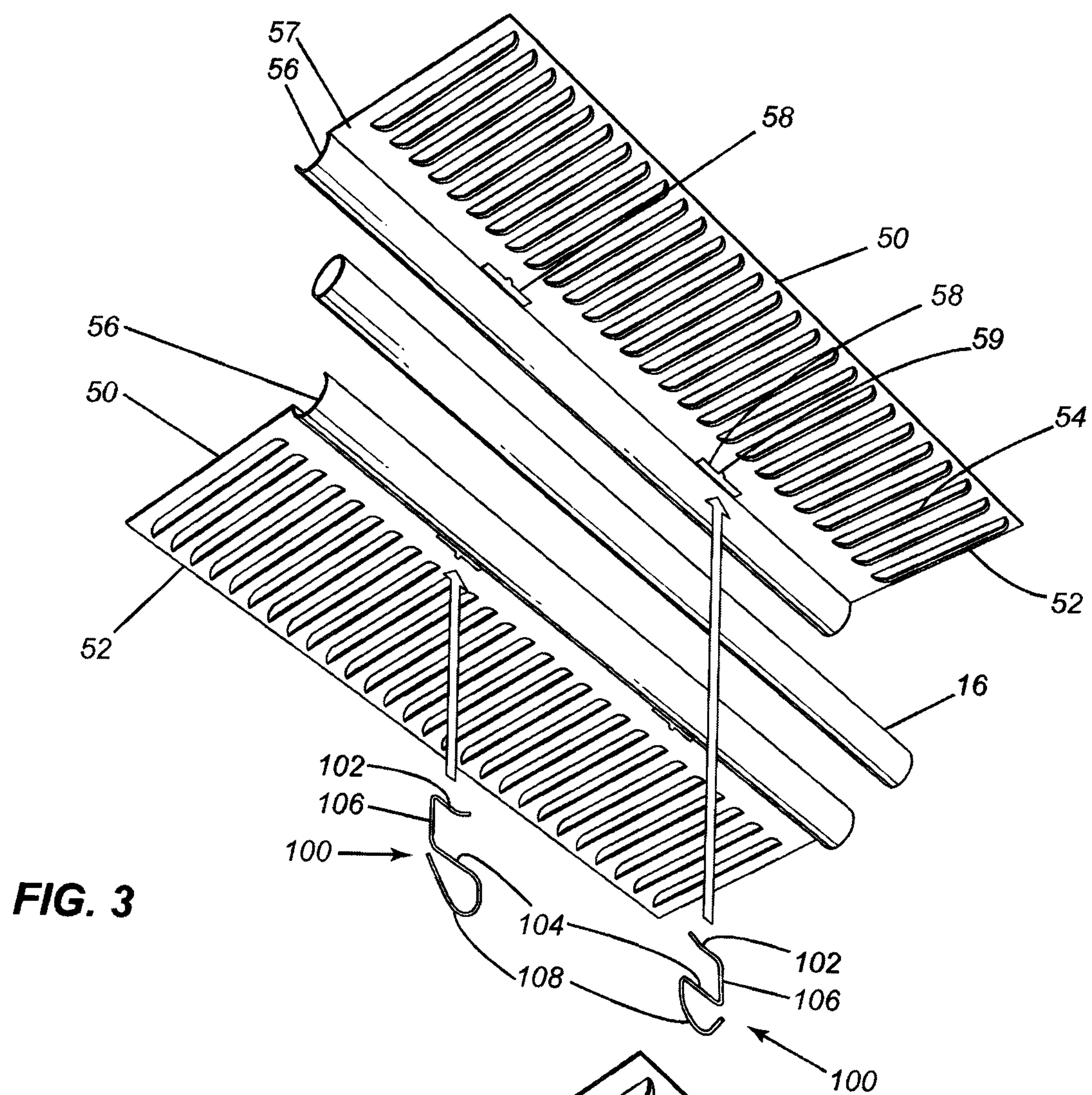


FIG. 2



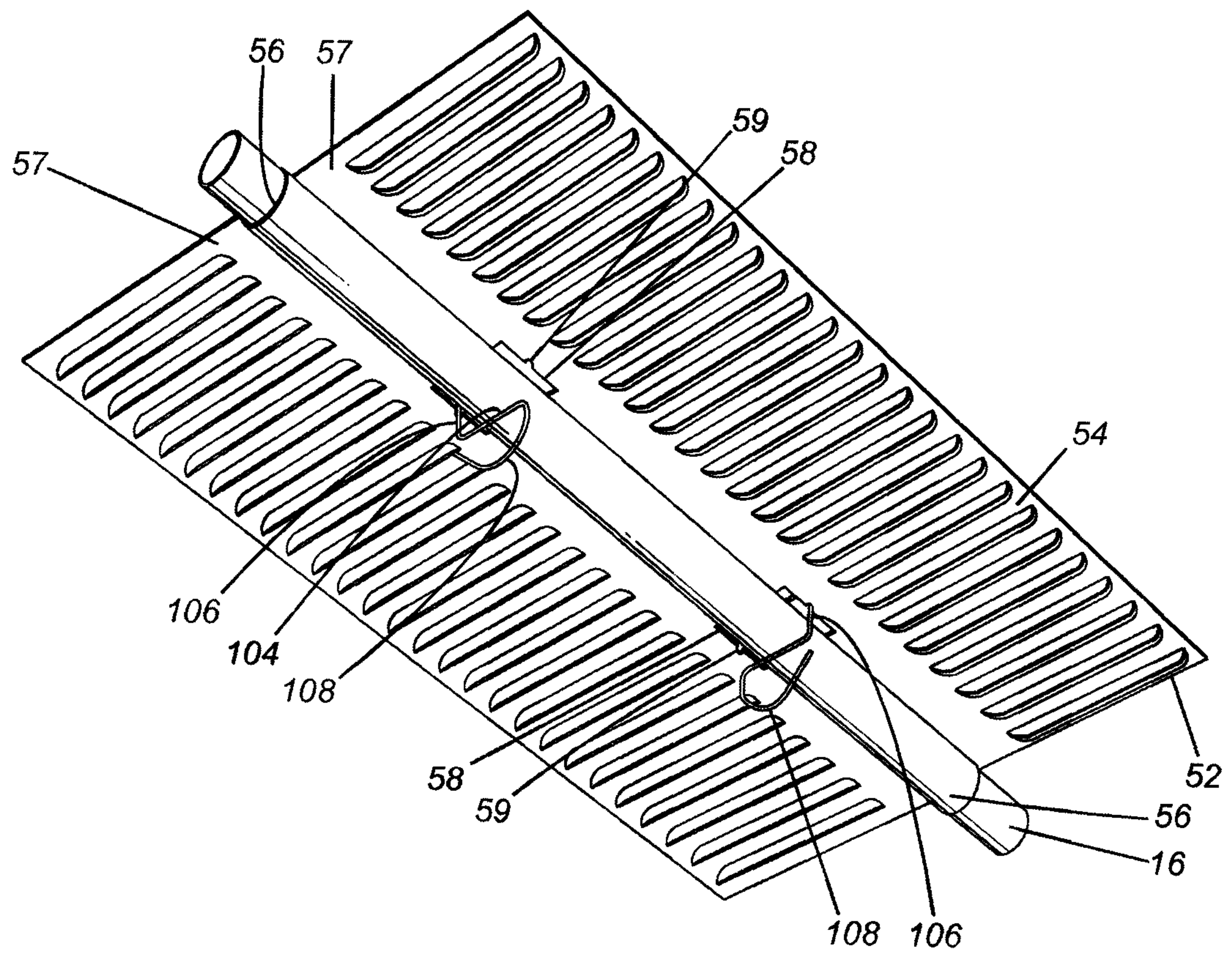


FIG. 5

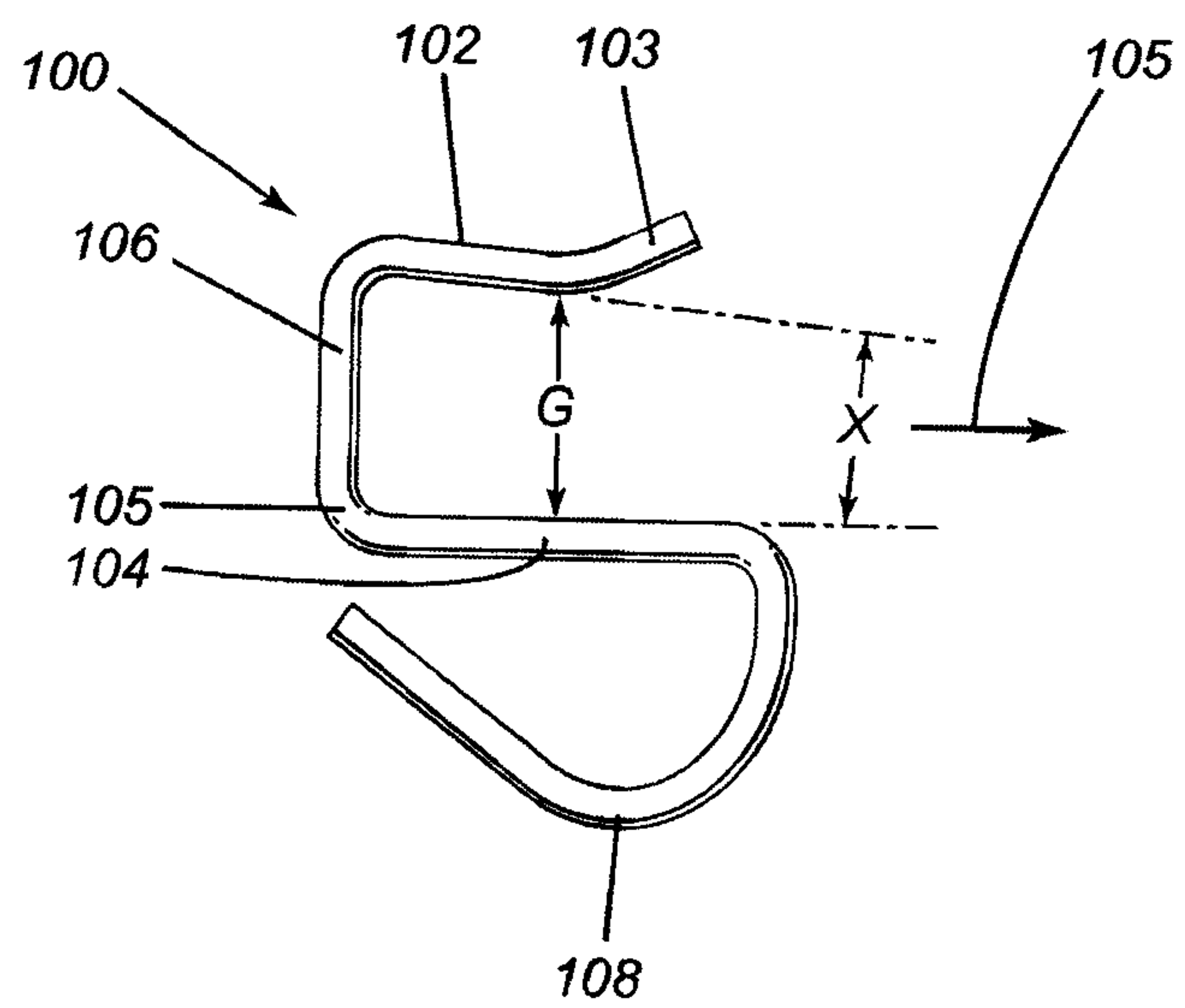


FIG. 6

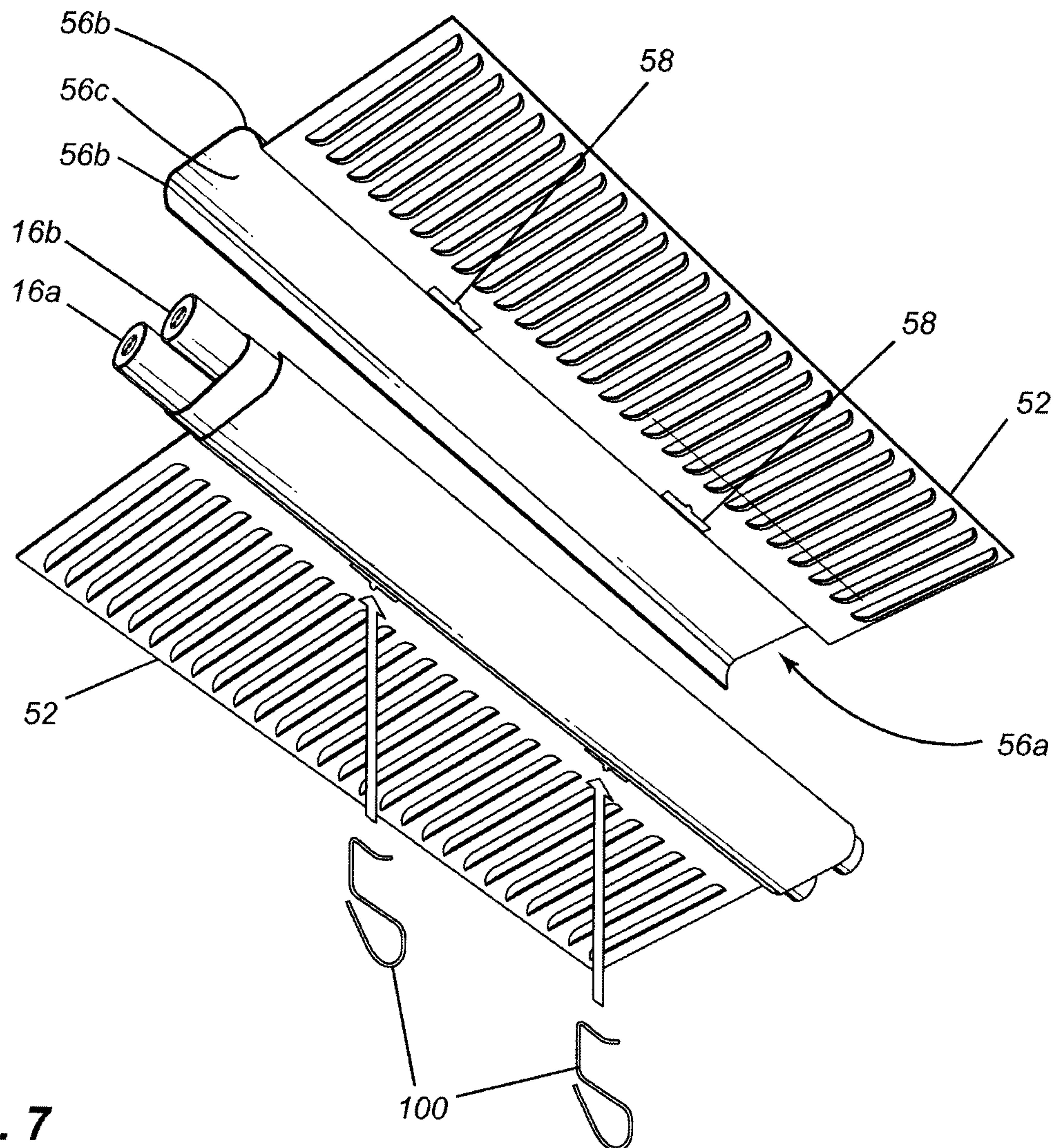


FIG. 7

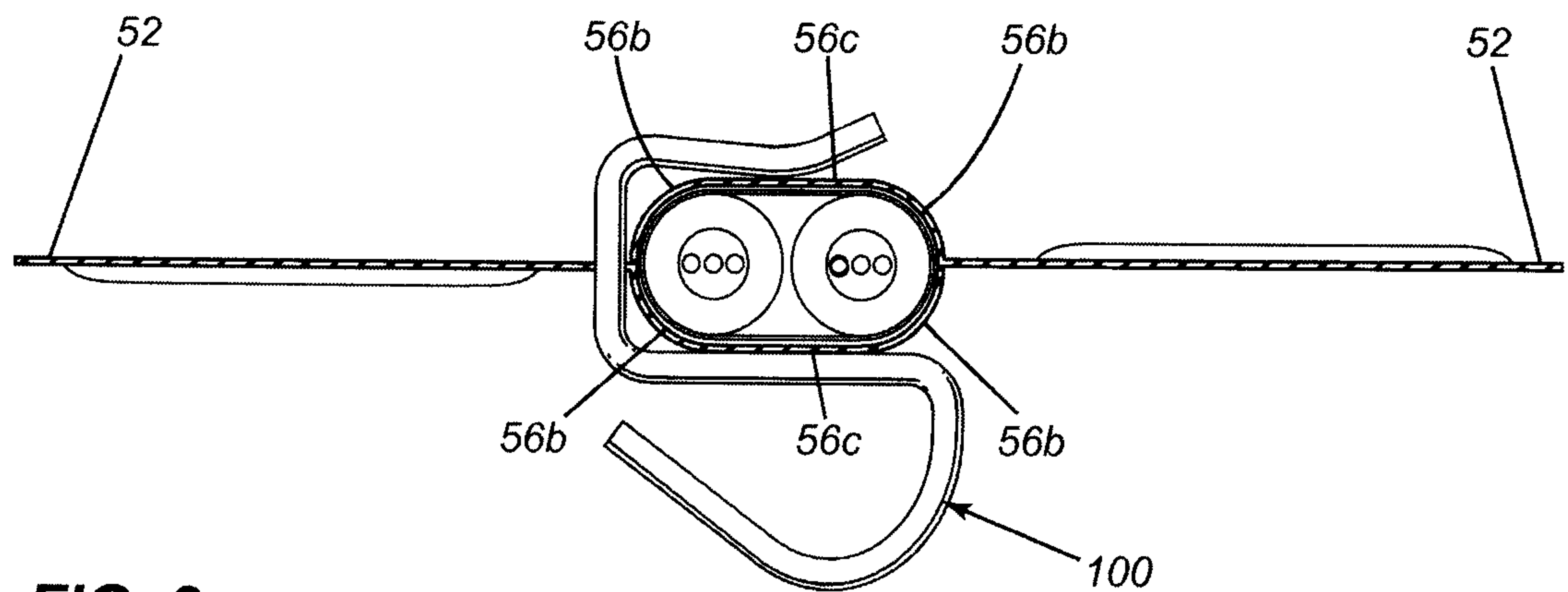


FIG. 8

