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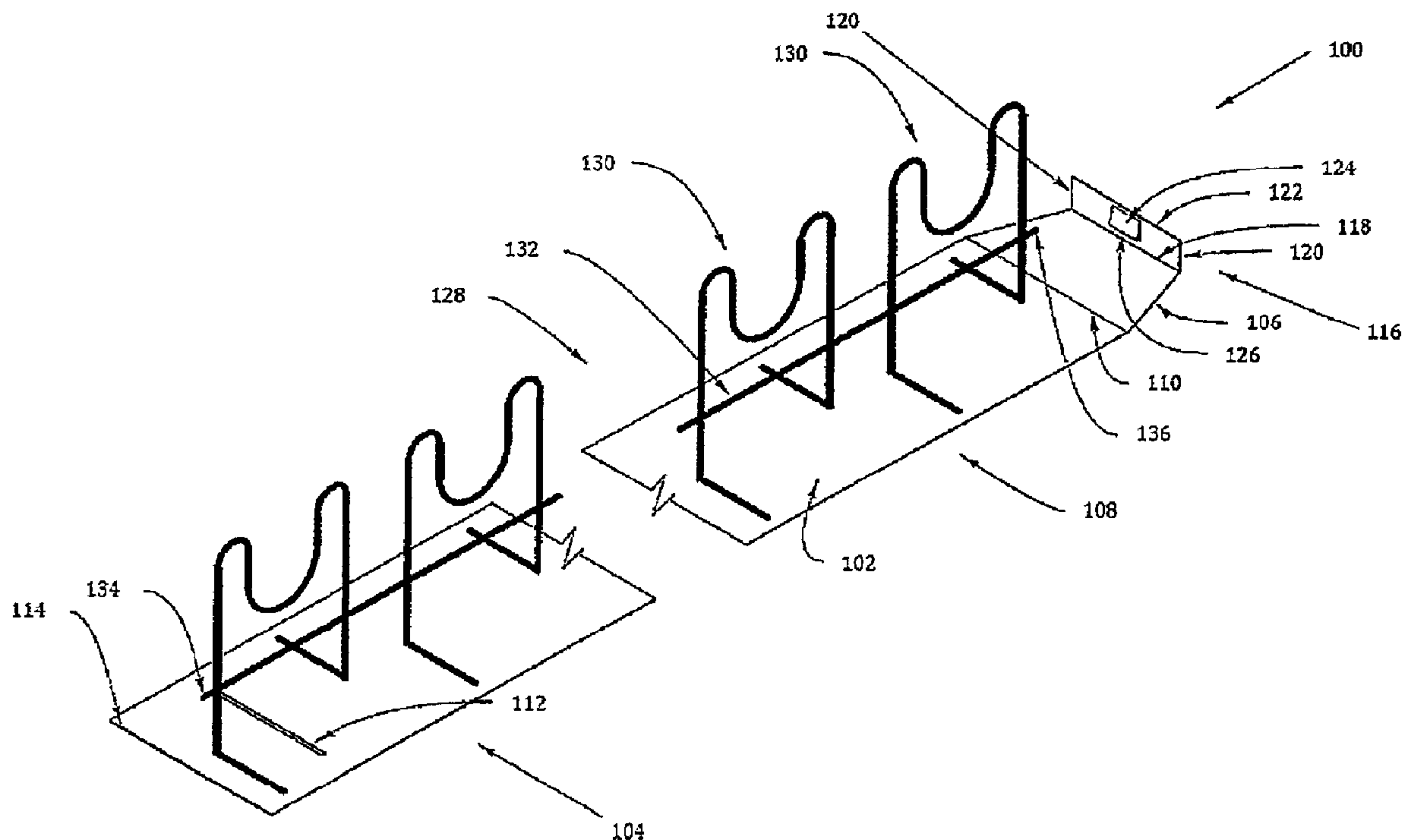
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(54) Titre : SECTION DE SUPPORT DE SIEGE POUR PATINOIRE DOTEES DE MECANISMES DE RACCORD
(54) Title: RINK CHAIR SUPPORT SECTION WITH COUPLING MEANS



(57) **Abrégé/Abstract:**

A rink chair support section for supporting cooling pipes and reinforcing bars in an ice rink is disclosed. The support section has a base structure with a first overlapping portion at one longitudinal end, a second overlapping portion at an opposite longitudinal end, and a middle portion intermediate the first and second overlapping portions. The support section also has a support arrangement to support the pipes and bars, which is attached to the first overlapping portion and the middle portion so as to stand upwardly therefrom. Further, the first overlapping portion has a hole that is arranged to receive a protruding element coupled to the second overlapping portion so as to longitudinally couple a first support section and a respective second support section end-to-end.

ABSTRACT

A rink chair support section for supporting cooling pipes and reinforcing bars in an ice rink is disclosed. The support section has a base structure with a first overlapping portion at one longitudinal end, a second overlapping portion at an
5 opposite longitudinal end, and a middle portion intermediate the first and second overlapping portions. The support section also has a support arrangement to support the pipes and bars, which is attached to the first overlapping portion and the middle portion so as to stand upwardly therefrom. Further, the first overlapping portion has a hole that is arranged to receive a protruding element coupled to the second
10 overlapping portion so as to longitudinally couple a first support section and a respective second support section end-to-end.

RINK CHAIR SUPPORT SECTION WITH COUPLING MEANS

FIELD OF THE INVENTION

The present invention relates to a rink chair support section for supporting cooling pipes and reinforcing bars prior to installation of a cast concrete layer thereupon in an ice rink of the type having coupling means for longitudinally
5 coupling a plurality of support sections end-to-end, and more particularly the present invention relates to a rink chair support section in which the coupling means includes a hole in a first overlapping portion and a protruding element coupled to a second overlapping portion, the hole being arranged for receiving the protruding element
10 therein so as to longitudinally couple first and second ones of the support sections end-to-end.

BACKGROUND

The disclosed invention is a rink chair support section for supporting cooling pipes and reinforcing bars prior to installation of a cast concrete layer
15 thereupon in an ice rink with coupling means, which affords longitudinal coupling of a plurality of support sections end-to-end.

During installation process of the cooling pipes and reinforcing bars in an ice rink, prior to receiving the cast concrete layer thereon, rink chair support sections similar to the ones described by U.S. Patent Nos. 5,467,948 (Gillespie) or
20 5,876,001 (Wiebe) are lined up in rows to span a full width of the ice rink on the horizontal ground surface thereof because a single rink chair support section is insufficiently long to span the full width of the ice rink. Each row of the support sections is formed by overlapping support sections laterally. This arrangement results in wasted material as each rink chair support section contributes one fewer individual
25 rink chair to a longitudinal length of the row due to the need to align the support

sections by overlapping each adjacent longitudinal end portion of adjacent support sections. Even after forming the rows, the support sections remain free to move relative to one another as the support sections are not coupled to each other. Only after the cooling pipes and reinforcing bars are placed upon the support sections is each support section restricted in longitudinal movement; however, the support sections still remain free to move transversely.

An example of a prior patent that describes floor elements that can be coupled so as to form an ice rink is U.S. Patent No. 6,021,646 to Burley. The patent given to Burley shows ice rink floor elements which comprise fastening elements that afford coupling of adjacent floor elements by sliding lateral insertion of the male fastening element of a first floor element into the female fastening element of a second floor element. However, these floor elements comprise channels through which coolant may be pumped, and as such do not support cooling pipes as in traditional construction of ice rinks like the apparatuses of U.S. Patent Nos. 5,467,948 and 5,876,001.

Another example of a prior patent is U.S. Patent No. 2,517,411 to Patterson for a fastener for refrigerator evaporator. The patent to Patterson includes a stem and a clip with an opening having tangs for fastening the clip to the stem. The tangs of the clip function as the retaining mechanism to fasten the clip to the stem. While the fastener is simple, it has not been applied to the field of apparatuses for supporting cooling pipes in ice rinks.

SUMMARY OF THE INVENTION

According to one aspect of the invention there is provided a rink chair support section for supporting cooling pipes and reinforcing bars prior to installation of a cast concrete layer thereupon in an ice rink, wherein the ice rink also comprises a

horizontal ground surface, the support section comprising:

a base structure for resting on the ground surface having:

a first overlapping portion at one longitudinal end, the first overlapping portion having a first end edge of at a free longitudinal end thereof;

5 a second overlapping portion at an opposite longitudinal end, the second overlapping portion having a second end edge at a free longitudinal end thereof;

a middle portion intermediate between the first and second overlapping portions;

10 opposing lateral edges joining the first and second end edges;

a junction line which defines a junction between the second overlapping portion and the middle portion, the junction line spanning between the lateral edges;

a support arrangement arranged to support the cooling pipes and reinforcing bars, the support arrangement being attached to the first overlapping portion and the middle portion so as to stand upwardly therefrom;

15 wherein the base structure of each one of the rink chair support sections further includes:

a hole in the first overlapping portion;

20 a protruding element coupled to the second overlapping portion, the protruding element having a first edge which meets a portion of the second overlapping portion;

wherein the hole is arranged to receive the protruding element therein so that a first one of the support sections and a second one of the support sections can be longitudinally coupled end-to-end in a working position.

25

The embodiment as described in more detail hereinafter overcomes the shortcomings of the prior art by providing a rink chair support section of a particular type that can be coupled end-to-end to support sections of the same type so that each one of a plurality of rink chair supports of the support arrangement of each respective support section supports a different cooling pipe when a plurality of support sections are arranged and coupled in a row. Furthermore, the present invention also provides a rink chair support section in which movement of a first support section relative to a respective second support section is reduced in the working position of the support sections.

10 Preferably, the first edge of the protruding element has a protruding element orientation relative to said junction line and the hole has a hole orientation relative to the first end edge, the hole orientation being arranged to match the protruding element orientation so as to align the first one of the support sections and the second one of the support sections in rectilinear alignment in the working position.

15 Preferably, the protruding element has first and second longitudinal surface portions facing in respective opposing longitudinal directions that are arranged to engage longitudinal edge portions of the hole at longitudinally opposing ends thereof so as to reduce movement between support sections in the longitudinal directions in the working position.

20 Preferably, the protruding element has first and second transverse surface portions facing in respective opposing transverse directions that are arranged to engage transverse edge portions of the hole at opposing transverse ends thereof so as to reduce movement between support sections in the transverse directions in the working position.

25 Preferably, the support arrangement has a first free end at one

longitudinal end of the support arrangement above the first overlapping portion, the first free end being spaced inward from the first end edge at a first distance, and a second free end at an opposing longitudinal end of the support arrangement above the middle portion and closer to the second overlapping portion than to the first overlapping portion, the second free end being spaced inward from the junction line at a second distance which is proximate the first distance so as to maintain proper spacing in the longitudinal direction between the cooling pipes and reinforcing bars supported by the support arrangements in the working position.

Preferably, the protruding element is arranged for insertion into the hole in the upward direction.

Preferably, the rink chair support section further includes a retaining mechanism that prevents the protruding element from being removed from the hole in the working position. Preferably, the retaining mechanism is a projecting element coupled to the protruding element so as to project away therefrom. Preferably, the projecting element has a free end which is arranged to engage the second overlapping portion when the protruding element is being removed from the hole in the working position. Preferably, the projecting element is a tab.

Preferably, the base structure is a horizontal base plate.

Preferably, the hole is a slot.

Preferably, the protruding element is a flange.

One embodiment of the invention will now be described in conjunction with the accompanying drawings in which:

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a right perspective view of a rink chair support section from its rear.

Figure 2 is a top plan view of the rink chair support section in Figure 1.

Figure 3 is a left elevation view of the rink chair support section in Figure 1.

Figure 4 is a right perspective view of two rink chair support sections from rears thereof, aligned with one another prior to coupling together in a working position.

Figure 5 is a right perspective view of the two rink chair support sections in Figure 4 coupled together in the working position.

Figure 6 is a left elevation view of the two rink chair support sections in Figure 5 coupled in the working position and supporting cooling pipes and reinforcing bars thereon.

In the drawings like characters of reference indicate corresponding parts in the different figures.

DETAILED DESCRIPTION

Referring to the accompanying figures there is illustrated a rink chair support section generally indicated by reference numeral 100 in FIG. 1. The rink chair support section is used to support cooling pipes 1 and reinforcing bars 2 of an ice rink upon a horizontal ground surface 4 thereof prior to receiving a cast concrete layer thereon.

The present embodiment of the rink chair support section 100 as shown in FIGS. 1-3 has a horizontal base plate 102 as a base structure for resting on the ground surface of the ice rink. The base plate is elongate and has a first overlapping portion 104 at one longitudinal end, a second overlapping portion 106 at an opposing longitudinal end, and a middle portion 108 intermediate between the overlapping portions. The first overlapping portion has a first end edge 110 of at a free longitudinal

end thereof, and the second overlapping portion has a second end edge 111 thereof which is at a free longitudinal end of the second overlapping portion. Furthermore, the base plate has opposing lateral edges which span between the first and second end edges. The first overlapping portion and the middle portion considered together are
5 rectangular in shape, and the second overlapping portion is trapezoidal in shape. The junction between the second overlapping portion and the middle portion is defined by a junction line 112 that spans between the opposing lateral edges of the base plate. The junction line meets each one of the lateral edges at a right angle at the middle portion, and the length of the junction line is a measure of a width of the horizontal
10 base plate in a lateral direction. The lateral edges of the base plate at the second overlapping portion start at the junction line and taper inward towards an axis at a longitudinal center of the base plate. The lateral edges at the second overlapping portion terminate at the second end edge. A length of the second end edge 111 is shorter than the width of the base plate 102, and the second end edge is centered
15 relative to the axis at the longitudinal center of the base plate.

The base plate 102 also has a slot 114 which is a hole in the first overlapping portion as better shown in FIG. 2. The slot is spaced inward from the first end edge 110 toward the junction line 112. The slot is elongate and has a start thereof at a first slot end edge proximate a first one of the lateral edges of the base plate. The
20 slot extends from the start of the slot to an end of the slot at a second slot end edge thereof proximate a second one of the lateral edges of the base plate. Opposing slot side edges, which are parallel, span in the lateral direction of the base plate 102 and join the first and second slot end edges. The slot side edges are parallel to the first end edge 114, and the slot is centered relative to the axis at the longitudinal center of
25 the base plate. Furthermore, a length of the slot 114 is less than the width of the base

plate 102, where the length of the slot is defined by a distance between a portion of each one of the first and second slot end edges closest to respective lateral edges of the base plate.

5 Additionally, the base plate 102 has a flange 116 which is a protruding element coupled to the second overlapping portion 106, projecting upwards therefrom as better shown in FIG. 3. The flange is configured for upwards insertion into the slot 118 such that the first one of the support sections and the second one of the support sections can be longitudinally coupled in rectilinear alignment in a working position when the first overlapping portion 104 of the second one of the support sections 10 overlaps the second overlapping portion of the first one of the support sections. The 10 flange has a bottom edge 118 which is a first edge of the protruding element that meets the second overlapping portion. To achieve the rectilinear alignment of the first and second ones of the support sections, the bottom edge is parallel to the junction line 112 so as to match the orientation of the slot 114 relative to the first end edge 110 15 of the first overlapping portion. The bottom edge of the flange is also centered relative to the axis at the longitudinal center of the base plate 102. Additionally, the bottom edge 118 of the flange 116 is arranged at a distance outward from the junction line, towards the second end edge of the second overlapping portion, so as to be equal to the spacing of the slot from the first end edge 110. Consequently, the first end edge is 20 substantially aligned with the junction line 112 in the working position, and the lateral edges of the base plate at the first overlapping portion extend laterally outward beyond the lateral edges at the second overlapping portion in the working position.

Because the bottom edge 118 of the flange 116 and the slot have rectilinear shape, two additional structural features are necessary in order to facilitate 25 interlocking of the flange and slot 114 so as to reduce movement between the first

one of the support sections and the second one of the support sections in the working position. Firstly, a thickness at the bottom edge of the flange defined by the distance between outer surfaces of the flange at the bottom edge is proximate a width of the slot, which is the distance between the opposite slot side edges. The respective outer surfaces of the flange define first and second longitudinal surface portions thereof facing in respective opposing longitudinal directions, and the slot side edges define longitudinal edge portions of the slot at longitudinally opposing ends thereof. Approximately matching the thickness at the bottom edge of the flange and the width of the slot reduces longitudinal movement of the first one of the support sections relative to the second one of the support sections in the working position because the outer surfaces of the flange engage the respective slot side edges in the working position. Also, a flange length defined as a distance between opposite flange side edges 120 at the bottom edge 118 is approximately equal to the length of the slot 114 such that lateral movement of the first one of the support sections relative to the second one of the support sections is reduced in the working position because the flange side edges engage the respective first and second end edges of the slot in the working position. The flange side edges 120 define first and second transverse surface portions of the flange facing in respective opposing transverse directions, and the first and second end edges of the slot define respective transverse edge portions of the slot at opposing transverse ends thereof.

Alluding to the structure of the flange 116 further, the flange side edges 120 start at the bottom edge 118, meeting the bottom edge at right angles, and extend vertically upwards therefrom. The side edges terminate at a top edge 122 of the flange that is aligned with the bottom edge so as to lie in a common vertical plane. Each of the side edges are parallel to one another, so that the flange length is uniform

from bottom to top. Furthermore, the distance between outer surfaces of the flange is consistent between the bottom edge and the top edge so that the thickness of the flange is uniform from bottom to top. As such, the first overlapping portion 104 of the second one of the support sections must be substantially parallel to the second overlapping portion 106 of the first one of the support sections so that the slot receives the flange therein.

For efficient use of material, a longitudinal length of the second overlapping portion 106 defined as a distance from the junction line 112 to the end edge of the second overlapping portion is equal to the spacing of the slot 114 from the first end edge 110 of the first overlapping portion 104. Thus, the bottom edge 118 of the flange 116 is aligned with the end edge of the second overlapping portion. Furthermore, the length of the end edge of the second overlapping portion is equal to the flange length. As such, the complete base structure of the support section can be manufactured from a single piece of material, and the flange 116 is created by bending an end portion at the free longitudinal end of the second overlapping portion 106 upwards.

A tab 124 is coupled to the flange 116 and is a projecting element that is rectangular in shape and orientated lengthwise in the lateral direction of the base plate 102. An uppermost edge of the tab is attached to the flange proximate the top edge thereof so that remaining three edges of the tab are free. The uppermost edge is attached to the flange so that a bottommost free end 126 is pivotable relative to the flange about the uppermost edge of the tab. Further, the bottommost free end of the tab is oriented downwards toward the second overlapping portion 106 and projects away from the flange in a neutral position thereof so as to engage the second overlapping portion in the working position of the support sections 100 when the

flange is being removed from the slot 114 in the downwardly direction. Opposite side edges of the tab join the uppermost edge to the bottommost free end and are parallel to one another, meeting both the uppermost edge and bottommost free end at right angles. The tab is centered relative to the flange such that the midpoint of the uppermost edge of the tab is aligned with the midpoint of the top edge 122 of the flange along a vertical axis. The tab serves as a retaining mechanism to prevent the flange 116 from being unintentionally removed from the slot 114 in the working position. The two support sections may be decoupled from the working position by first pressing the bottommost free end 126 of the tab 124 towards the flange in a compressed position of the tab and holding the tab therein; then, the flange is removed from the slot by lifting the first overlapping portion 104 of the second one of the support sections, lowering the second overlapping portion 106 of the first one of the support sections, or a combination of the two actions. The tab 124 may be released from the compressed position as soon as the slot 114 is generally above the bottommost free end 126 of the tab.

A support arrangement 128 is arranged on the base plate 102 to support the cooling pipes and reinforcing bars. The support arrangement is attached to the first overlapping portion 104 and the middle portion 108 so as to stand upwardly therefrom. The support arrangement comprises a plurality of rink chair supports 130 arranged in a row across the base. Each one of the rink chair supports provides support for a single cooling pipe. A horizontal support member 132 spans a full length of the support arrangement and is arranged to support reinforcing bars between adjacent rink chair supports on the horizontal support member. The horizontal support member is arranged at a height above the base plate 102, yet below the portions of the rink chairs where the cooling pipes are supported therein. The rink chair supports

are spaced longitudinally along the base plate so as to support the cooling pipes at proper longitudinal intervals, which is important for providing uniform cooling of the cast covering layer of the ice rink. Further, the horizontal support member has a first free end 134 at one longitudinal end thereof above the first overlapping portion that is spaced inward horizontally at a first distance from the first end edge 110 toward the junction line 112. A second free end 136 of the horizontal support member at an opposite longitudinal end thereof above the middle portion 108 and closer to the second overlapping portion than to the first overlapping portion is spaced inward horizontally at a second distance from the junction line toward the first end edge 110. The second distance is approximately equal to the first distance so as to maintain proper spacing in the longitudinal direction between the cooling pipes and reinforcing bars supported by the support arrangements 128 in the working position.

In use, the rink chair support sections 100 are first arranged end-to-end in a plurality of rows. Each one of the rows spans a full width or a full length of the ice rink, and the plurality of rows are spaced therebetween along a dimension of the ice rink transverse to the rows. After arranging the rows, the support sections within each one of the rows are coupled to one another. As illustrated in FIG. 4, coupling is accomplished by positioning the first overlapping portion 104 of a second support section above the second overlapping portion 106 of a first support section so that the slot 114 of the second support section is vertically aligned with the flange 116 of the first support section in a common vertical plane. Next, the second support section is lowered onto the first support section so that the corresponding overlapping portions of respective support sections overlap. Lowering the first overlapping portion of the second support section onto the second overlapping portion of the first support section in the manner described will cause the slot of the second support section to

engage the tab 124 coupled to the flange of the first support section, pushing the bottommost free end 126 of the tab towards the flange and allowing the flange to be inserted into the slot. The longitudinal end-to-end coupling ensures that each one of rink chair supports 130 in each one of the rows supports a different cooling pipe.

5 Once the support sections of each one of the rows are coupled together as in FIGS. 5-6, the second free end 136 of the support arrangement 128 of the first support section should be proximate in alignment with the first free end 134 of the horizontal support member of the second support section in height in a vertical axis, and horizontally both in a longitudinal axis and in a transverse axis. Note that to decouple

10 support sections, the reverse process of the coupling procedure should be followed; however, the tab 124 has to be pressed and held in the compressed position until the slot 114 is above the bottommost free end 126 of the tab, so that the flange 116 can be removed from the slot.

Once all of the support sections comprising each one of the rows are

15 coupled together, the support sections are ready to receive the cooling pipes 1 and reinforcing bars 2 in the support arrangements 128 of the support sections. First, a first layer of reinforcing bars is set upon the rink chair support sections so as to be received in the rink chair support sections by the support arrangements thereof, extending across the rows and lying in a first common horizontal plane; the first layer

20 of reinforcing bars are mutually perpendicular to the rows. Next, a second layer of reinforcing bars is set so as rest upon the first layer of reinforcing bars, extending across the first layer and lying in a second common horizontal plane above the first plane; the second layer of reinforcing bars are mutually transverse to the first layer of reinforcing bars at right angles thereto and mutually parallel to the rows. Finally, the

25 cooling pipes are set upon the rink chair support sections so as to be received in the

rink chair support sections by the support arrangements thereof, extending across the second layer of reinforcing bars and lying in a third common horizontal plane that is above the first plane and above the second plane; the cooling pipes are mutually transverse to the rows at right angles thereto, mutually parallel to the first layer of reinforcing bars, and mutually transverse to the second layer of reinforcing bars at right angles thereto. After all of the reinforcing bars 2 and cooling pipes 1 are set in a manner similar to an arrangement just described that is generally illustrated in FIG. 6 without the second layer of reinforcing bars, the cast concrete layer may be applied so as to embed the reinforcing bars and cooling pipes therein.

10 Since various modifications can be made in my invention as herein above described, and many apparently widely different embodiments of same made, it is intended that all matter contained in the accompanying specification shall be interpreted as illustrative only and not in a limiting sense.

CLAIMS:

1. A rink chair support section for supporting cooling pipes and reinforcing bars prior to installation of a cast concrete layer thereupon in an ice rink, wherein the ice rink also comprises a horizontal ground surface, the support section
- 5 comprising:
- a base structure for resting on the ground surface having:
 - a first overlapping portion at one longitudinal end, the first overlapping portion having a first end edge of at a free longitudinal end thereof;
 - a second overlapping portion at an opposite longitudinal end, the

10 second overlapping portion having a second end edge at a free longitudinal end thereof;

 - a middle portion intermediate between the first and second overlapping portions;
 - opposing lateral edges joining the first and second end edges;

15 a junction line which defines a junction between the second overlapping portion and the middle portion, the junction line spanning between the lateral edges;

 - a support arrangement arranged to support the cooling pipes and reinforcing bars, the support arrangement being attached to the first overlapping

20 portion and the middle portion so as to stand upwardly therefrom;
- wherein the base structure of each one of the rink chair support sections further includes:
- a hole in the first overlapping portion;
 - a protruding element coupled to the second overlapping portion,

25 the protruding element having a first edge which meets a portion of the second

overlapping portion;

wherein the hole is arranged to receive the protruding element therein so that a first one of the support sections and a second one of the support sections can be longitudinally coupled end-to-end in a working position.

5 2. The support section according to claim 1, wherein the first edge of the protruding element has a protruding element orientation relative to said junction line and the hole has a hole orientation relative to the first end edge, the hole orientation being arranged to match the protruding element orientation so as to align the first one of the support sections and the second one of the support sections in
10 rectilinear alignment in the working position.

 3. The support section according to either one of claims 1 or 2, wherein the protruding element has first and second longitudinal surface portions facing in respective opposing longitudinal directions that are arranged to engage longitudinal edge portions of the hole at longitudinally opposing ends thereof so as to
15 reduce movement between support sections in the longitudinal directions in the working position.

 4. The support section according to any one of claims 1 to 3, wherein the protruding element has first and second transverse surface portions facing in respective opposing transverse directions that are arranged to engage
20 transverse edge portions of the hole at opposing transverse ends thereof so as to reduce movement between support sections in the transverse directions in the working position.

 5. The support section according to any one of claims 1 to 4, wherein the support arrangement has a first free end at one longitudinal end of the
25 support arrangement above the first overlapping portion, the first free end being

spaced inward from the first end edge at a first distance, and a second free end at an opposing longitudinal end of the support arrangement above the middle portion and closer to the second overlapping portion than to the first overlapping portion, the second free end being spaced inward from the junction line at a second distance
5 which is proximate the first distance so as to maintain proper spacing in the longitudinal direction between the cooling pipes and reinforcing bars supported by the support arrangements in the working position.

6. The support section according to any one of claims 1 to 5, wherein the protruding element is arranged for insertion into the hole in the upward
10 direction.

7. The support section according to any one of claims 1 to 6, further comprising a retaining mechanism that prevents the protruding element from being removed from the hole in the working position.

8. The support section according to claim 7, wherein the retaining
15 mechanism is a projecting element coupled to the protruding element so as to project away therefrom.

9. The support section according to claim 8, wherein the projecting element has a free end which is arranged to engage the second overlapping portion when the protruding element is being removed from the hole in the working position.

20 10. The support section according to either one of claims 8 or 9, wherein the projecting element is a tab.

11. The support section according to any one of claims 1 to 10, wherein the base structure is a horizontal base plate.

25 12. The support section according to any one of claims 1 to 11, wherein the hole is a slot.

13. The support section according to any one of claims 1 to 12, wherein the protruding element is a flange.

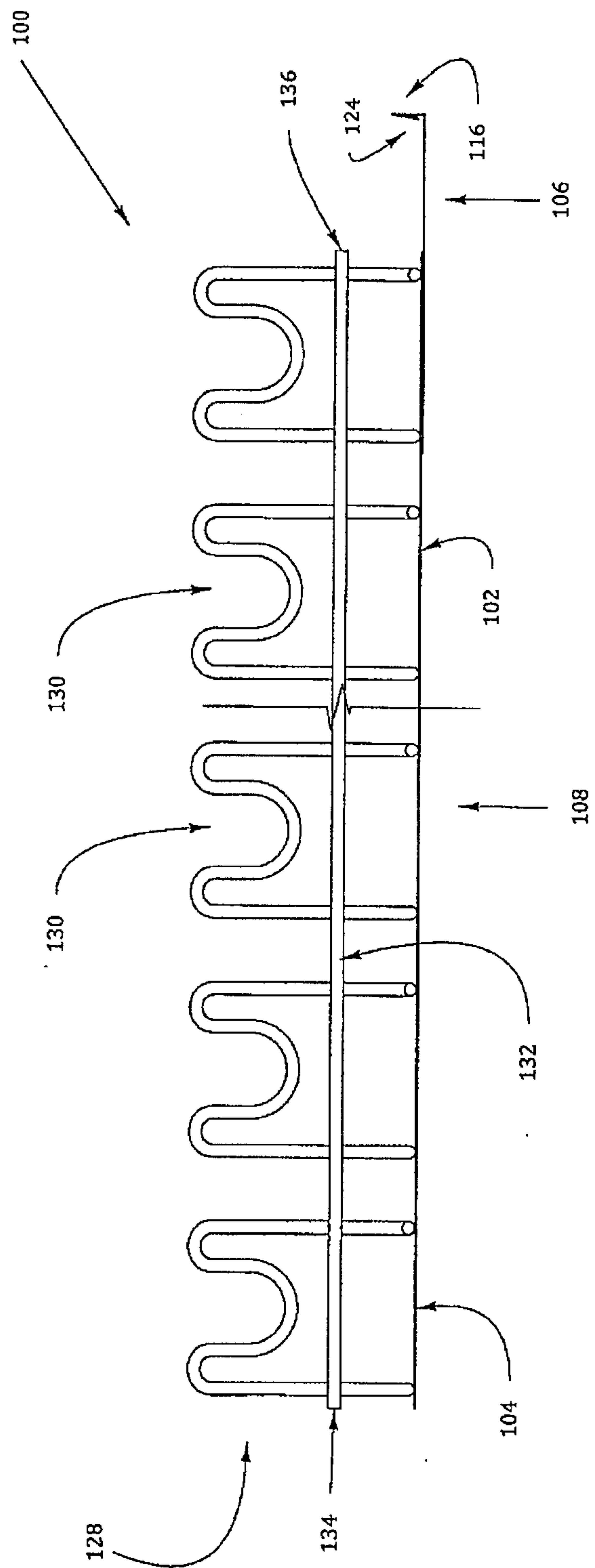


FIG. 3

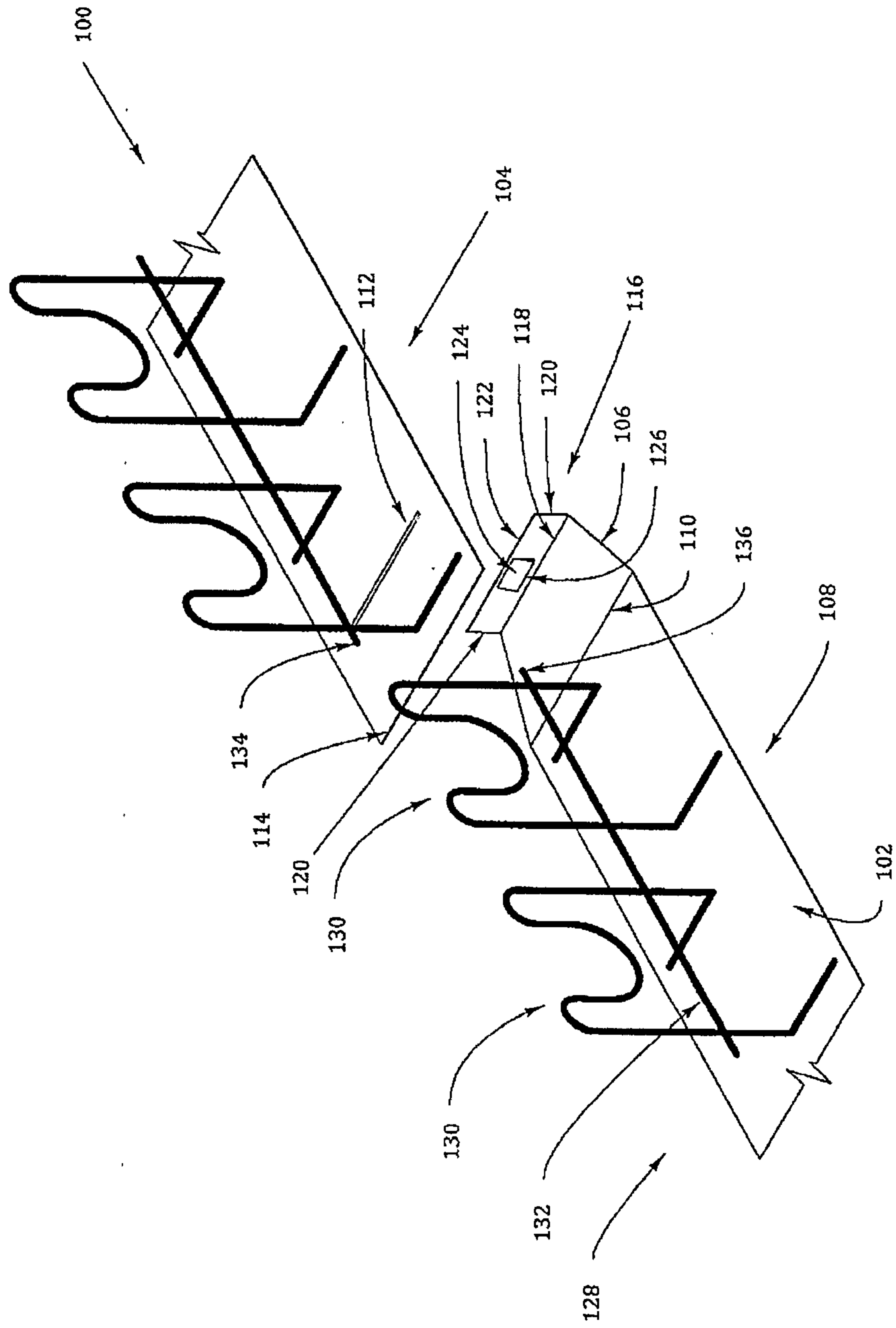


FIG. 4

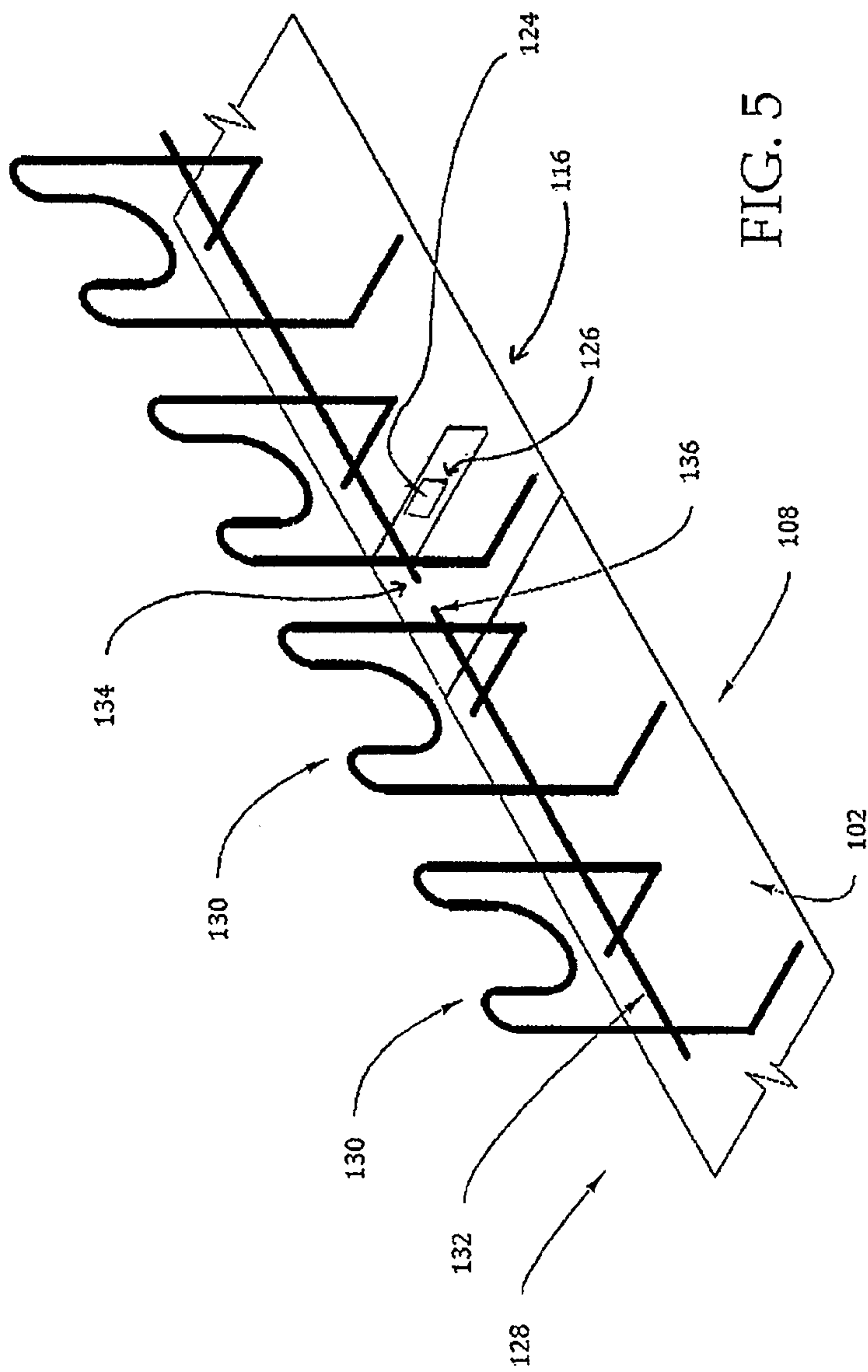


FIG. 5

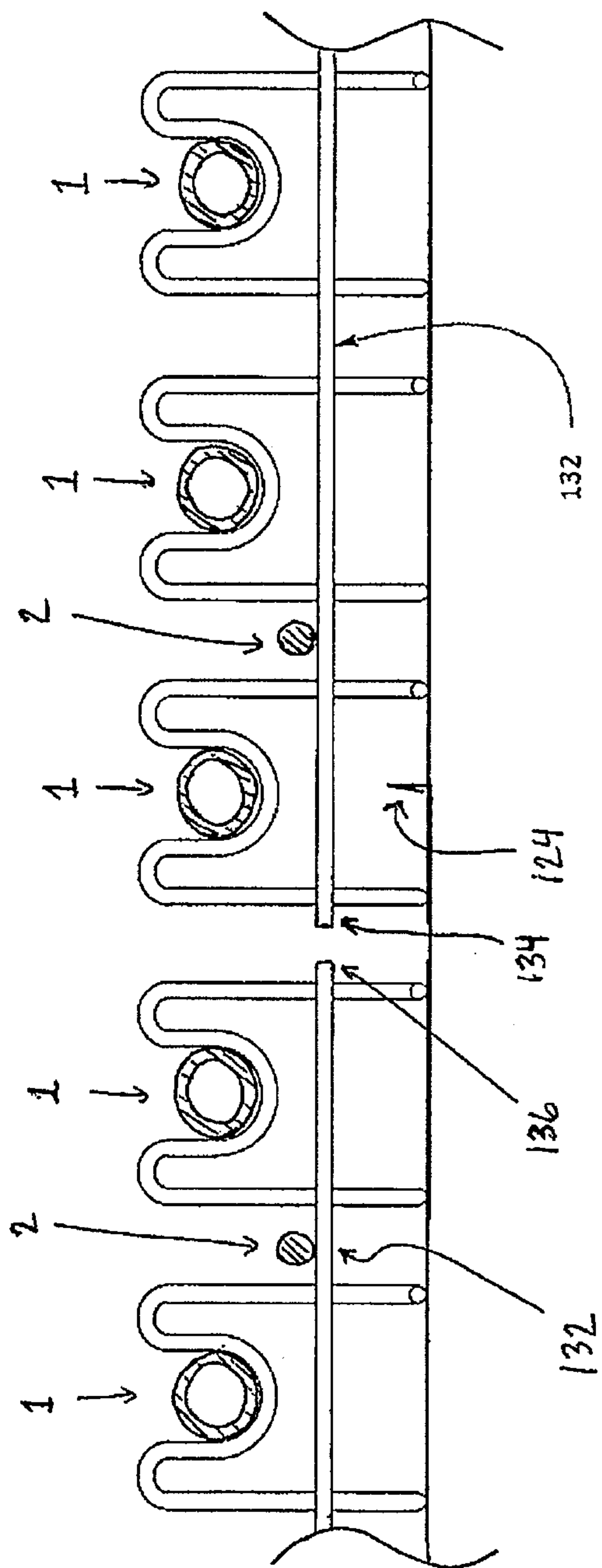


FIG. 6

