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(54) **EMERGENCY SHOWER AND/OR EYEWASH STATION WITH INTEGRATED HEATER**

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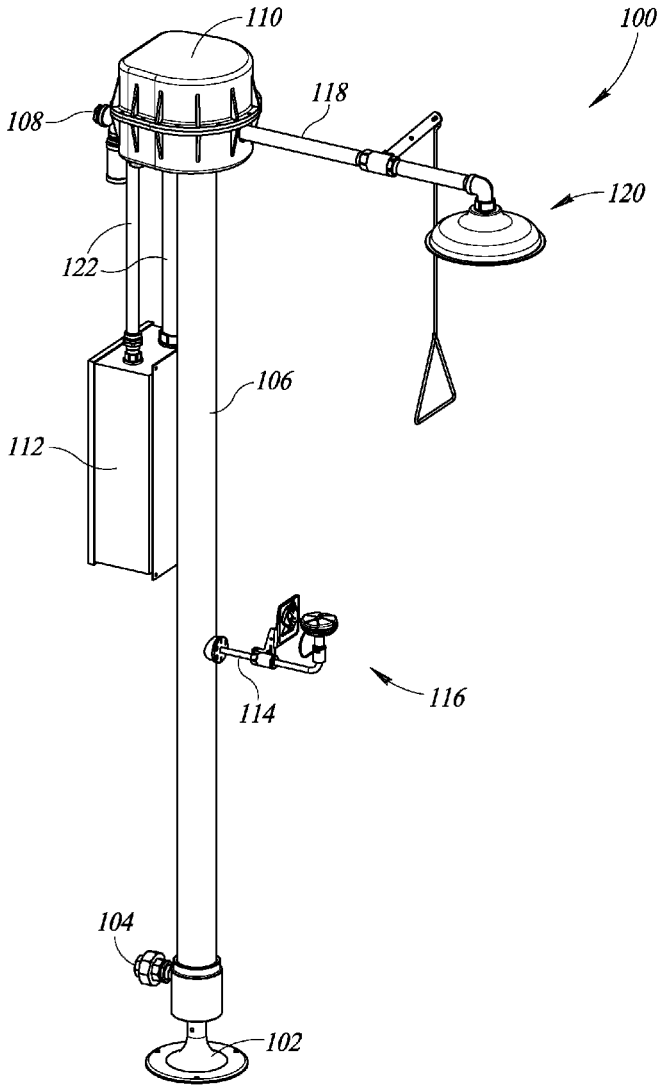
(52) **U.S. Cl.**

CPC ***A47K 3/286*** (2013.01); ***G05D 23/1393*** (2013.01); ***A61H 33/005*** (2013.01); ***A61H 33/00*** (2013.01)

(57) **ABSTRACT**

An emergency shower includes a column having upper and lower inlets, outer, intermediate, and inner pipes defining outer, intermediate, and inner conduits, and one or more heating coils positioned within one or more of the conduits. An instantaneous water heater can be integrated into the column of the emergency shower. The emergency shower can include a shower head and an eyewash assembly for cleaning a person after the person encounters toxic materials.



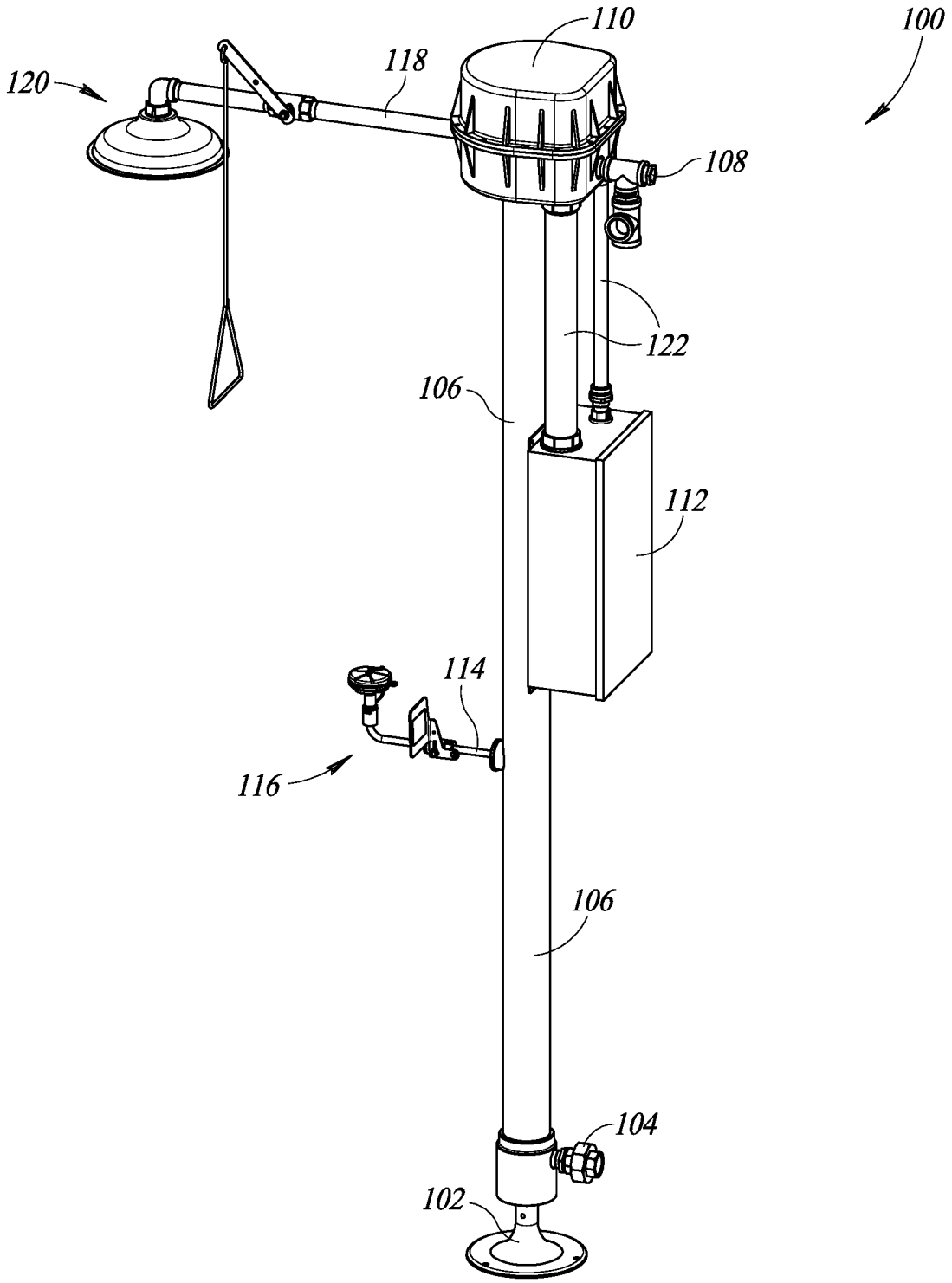


FIG. 1

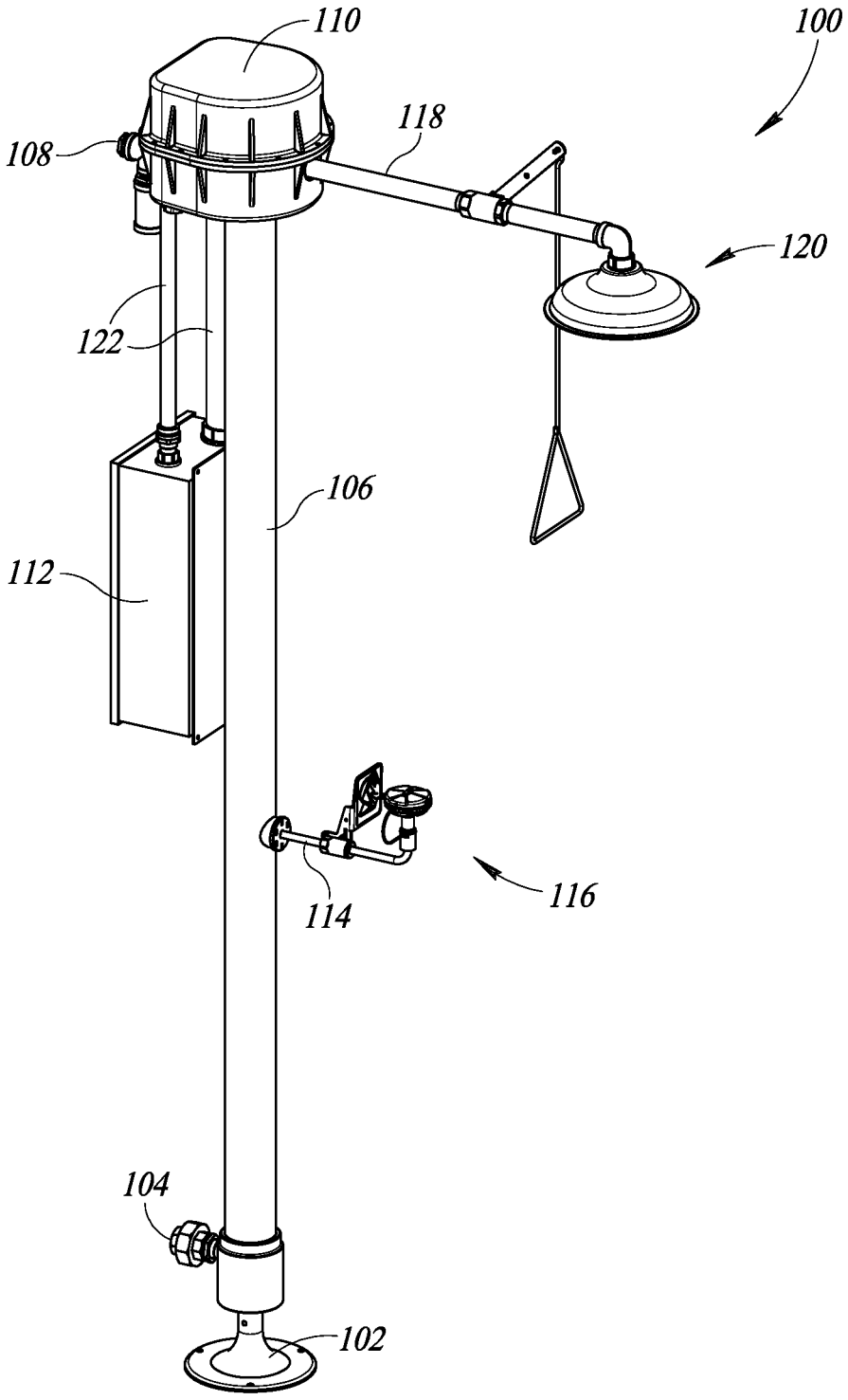


FIG. 2

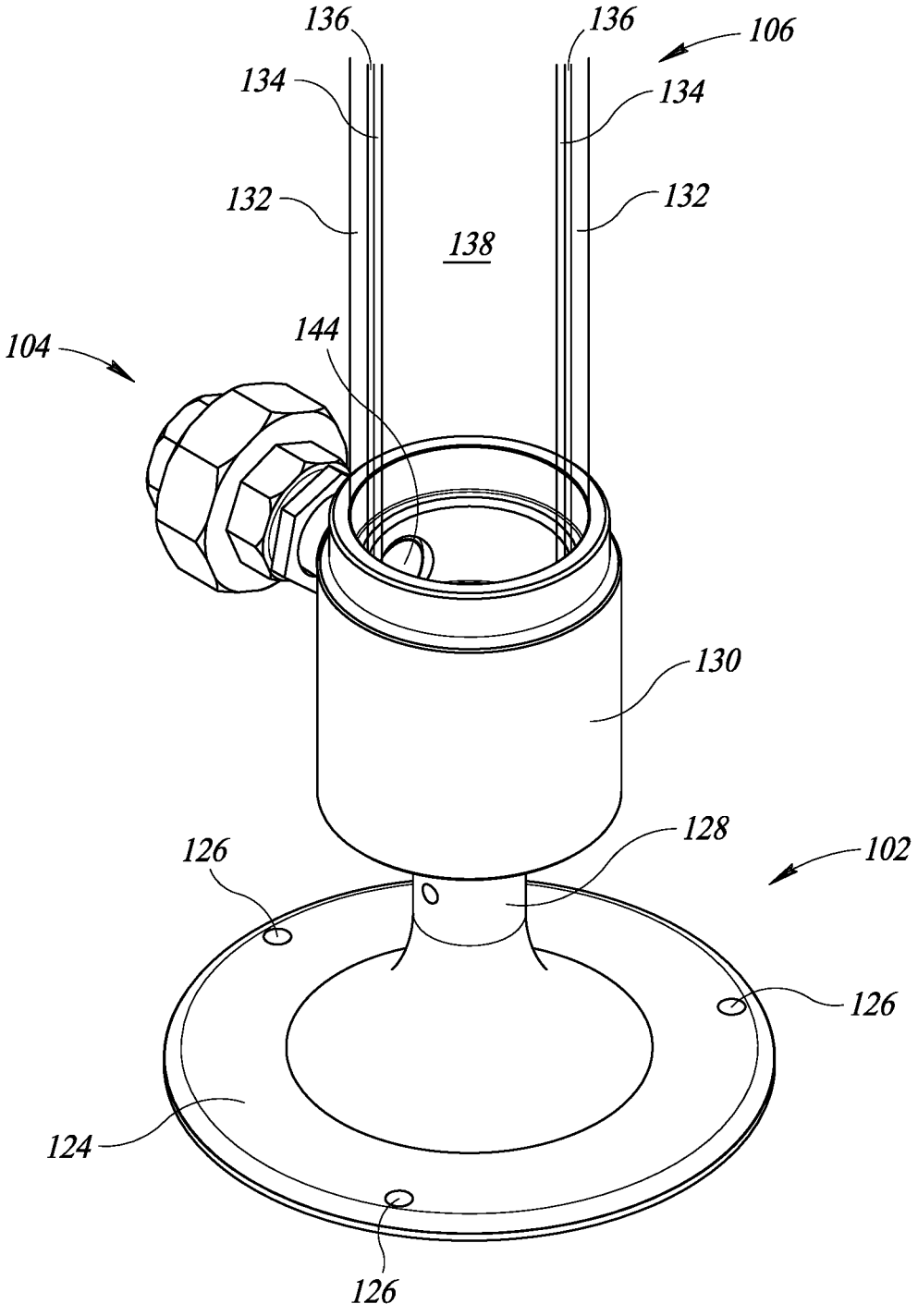

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FIG. 3

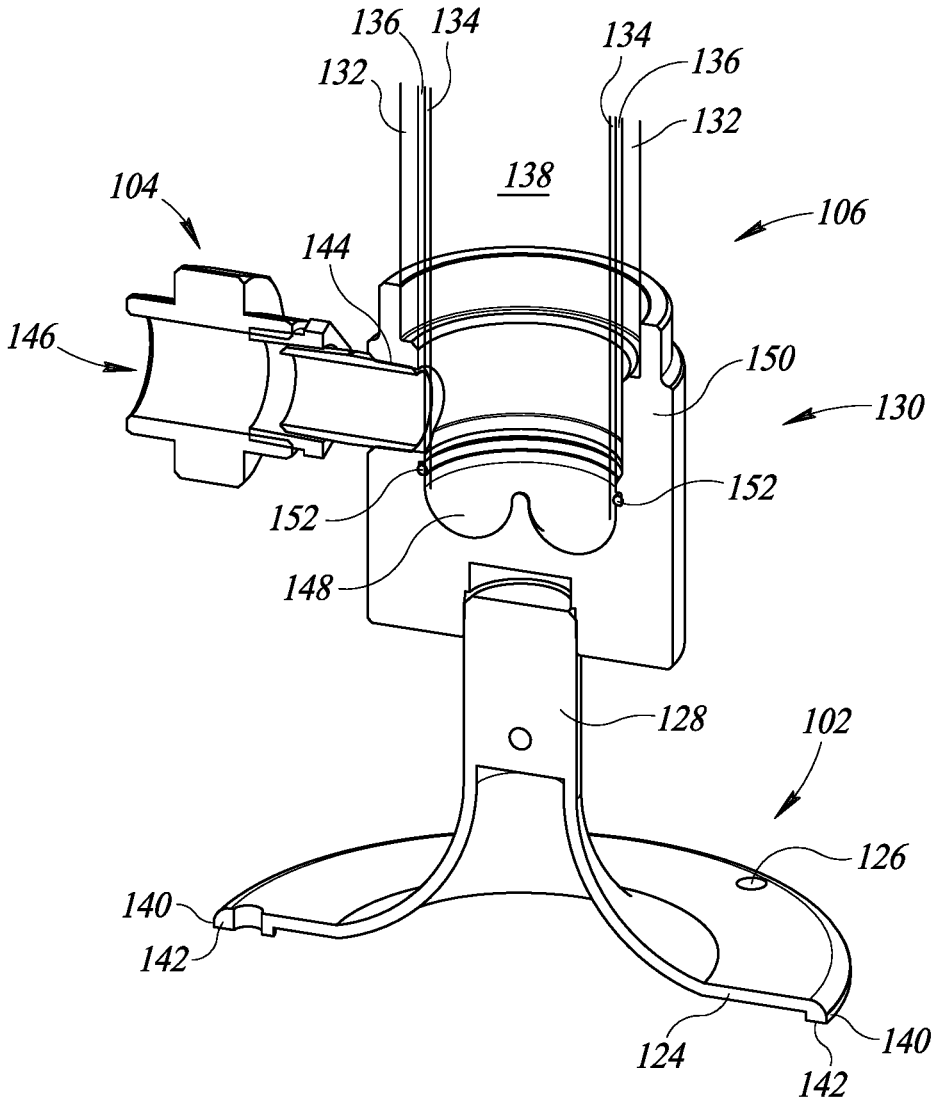
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FIG. 4

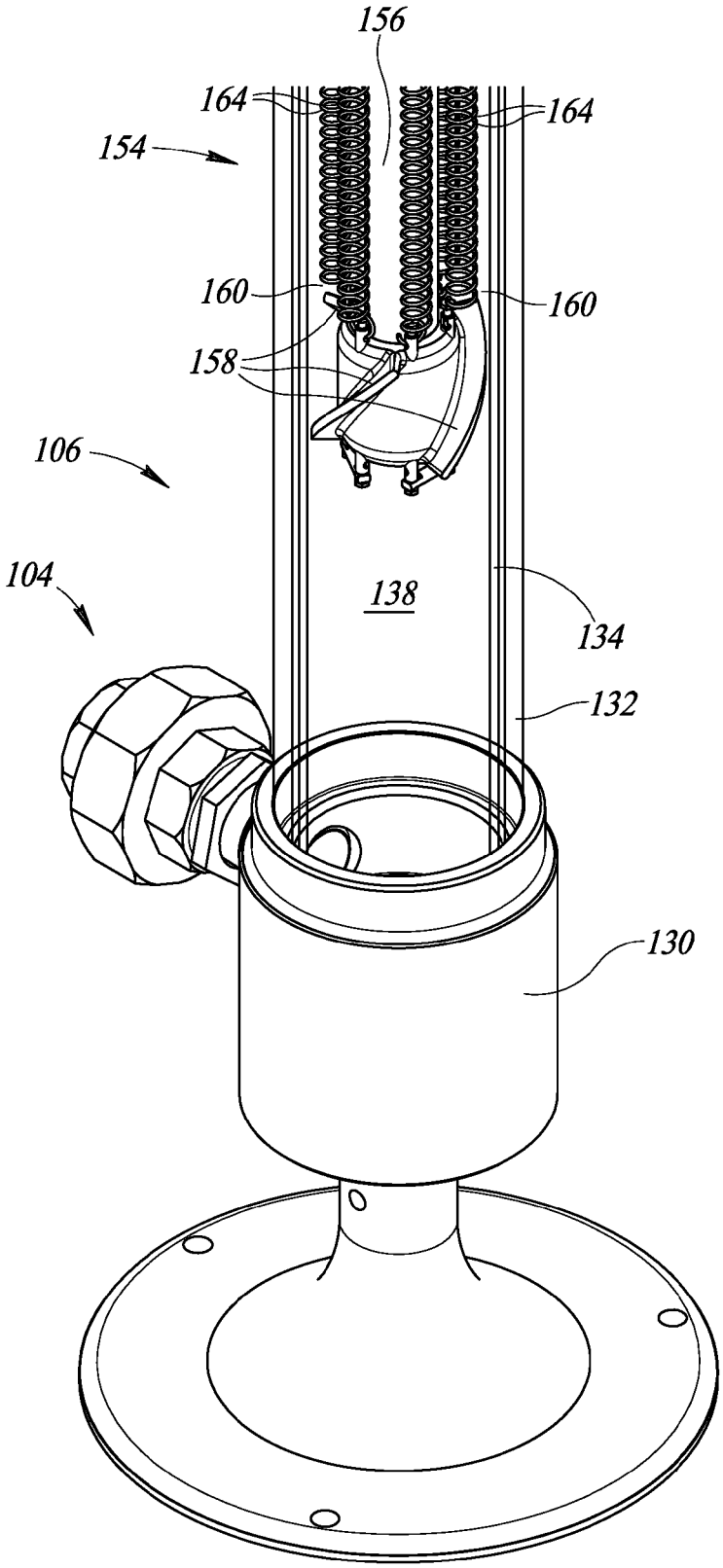

FIG. 5

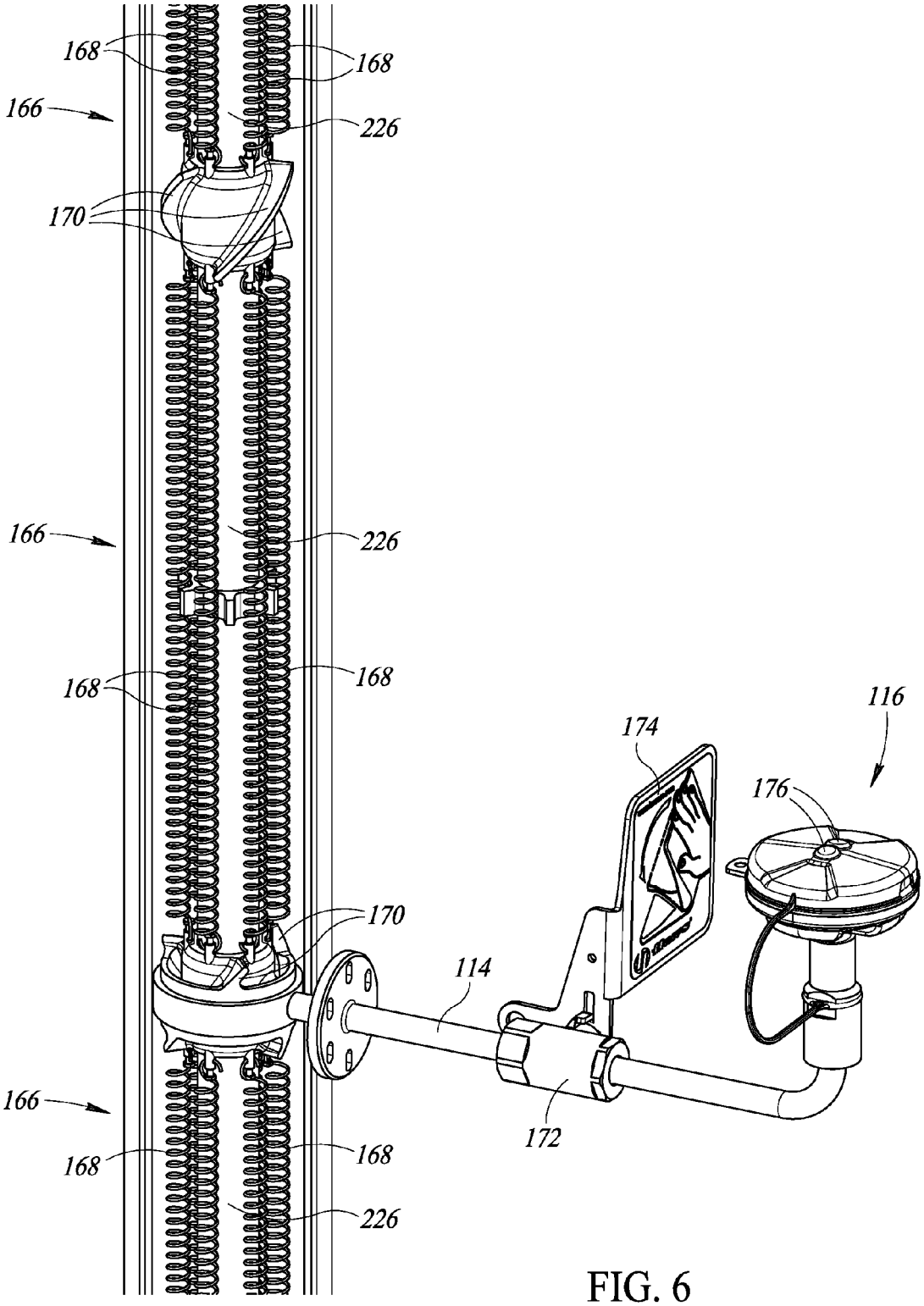
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FIG. 6

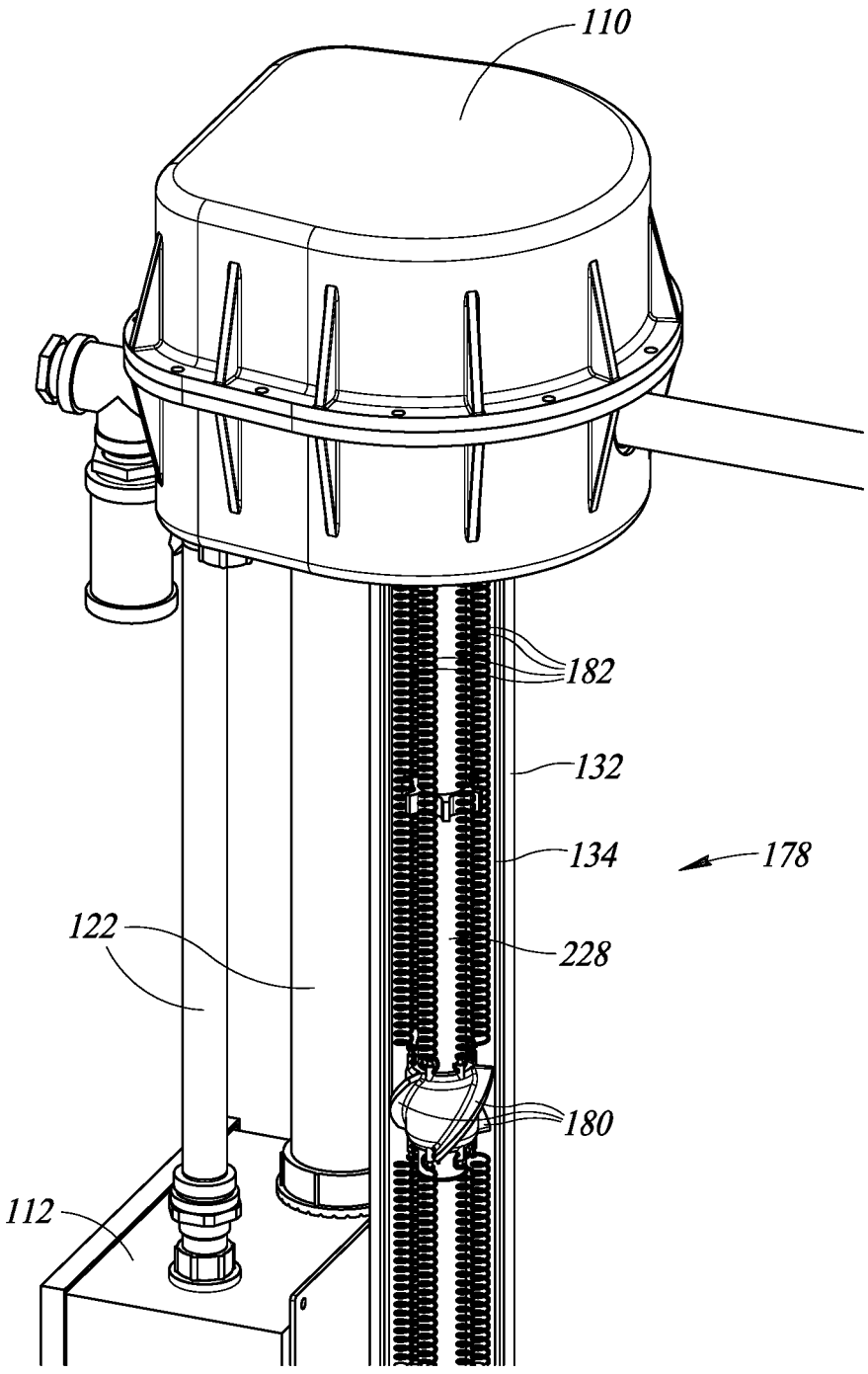

FIG. 7

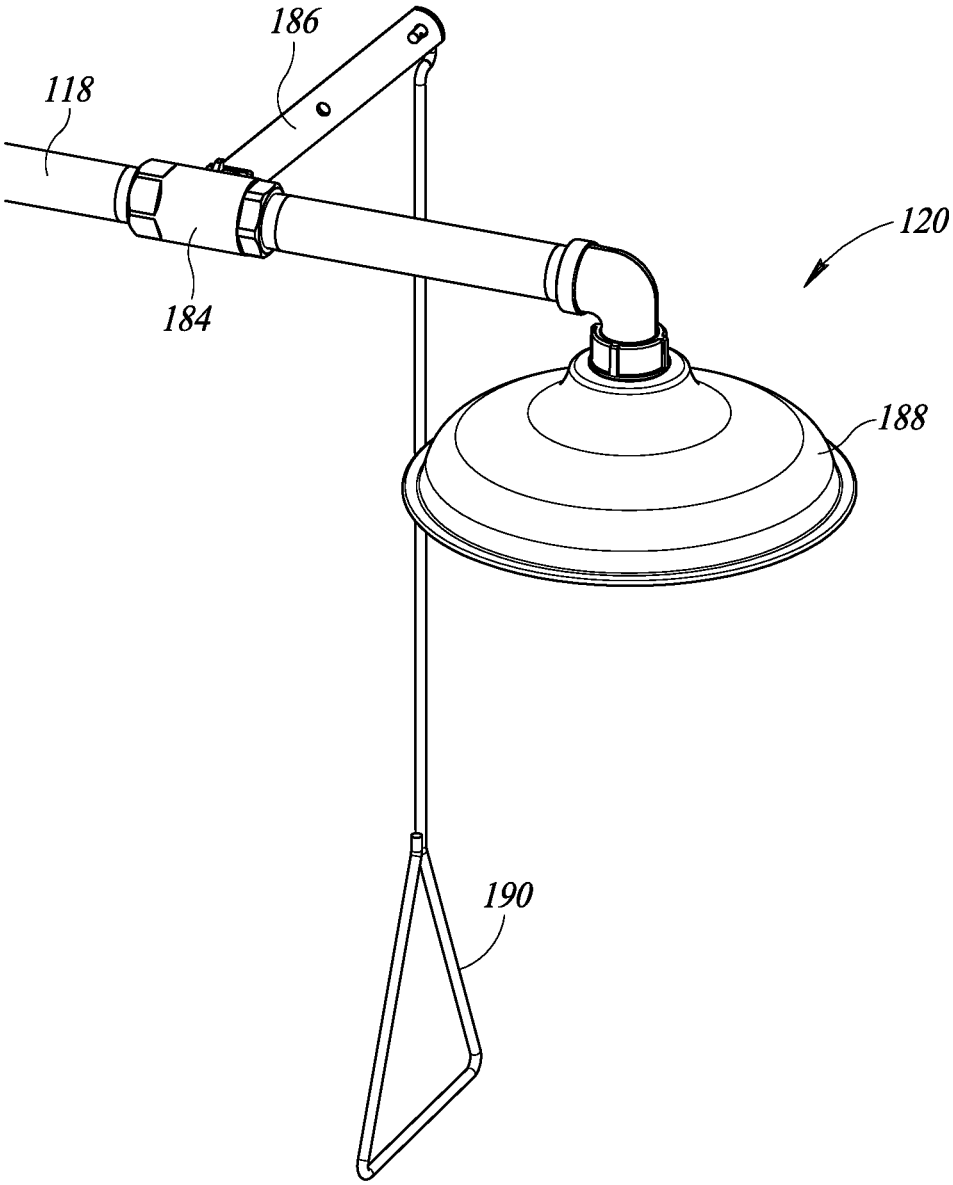

FIG. 8

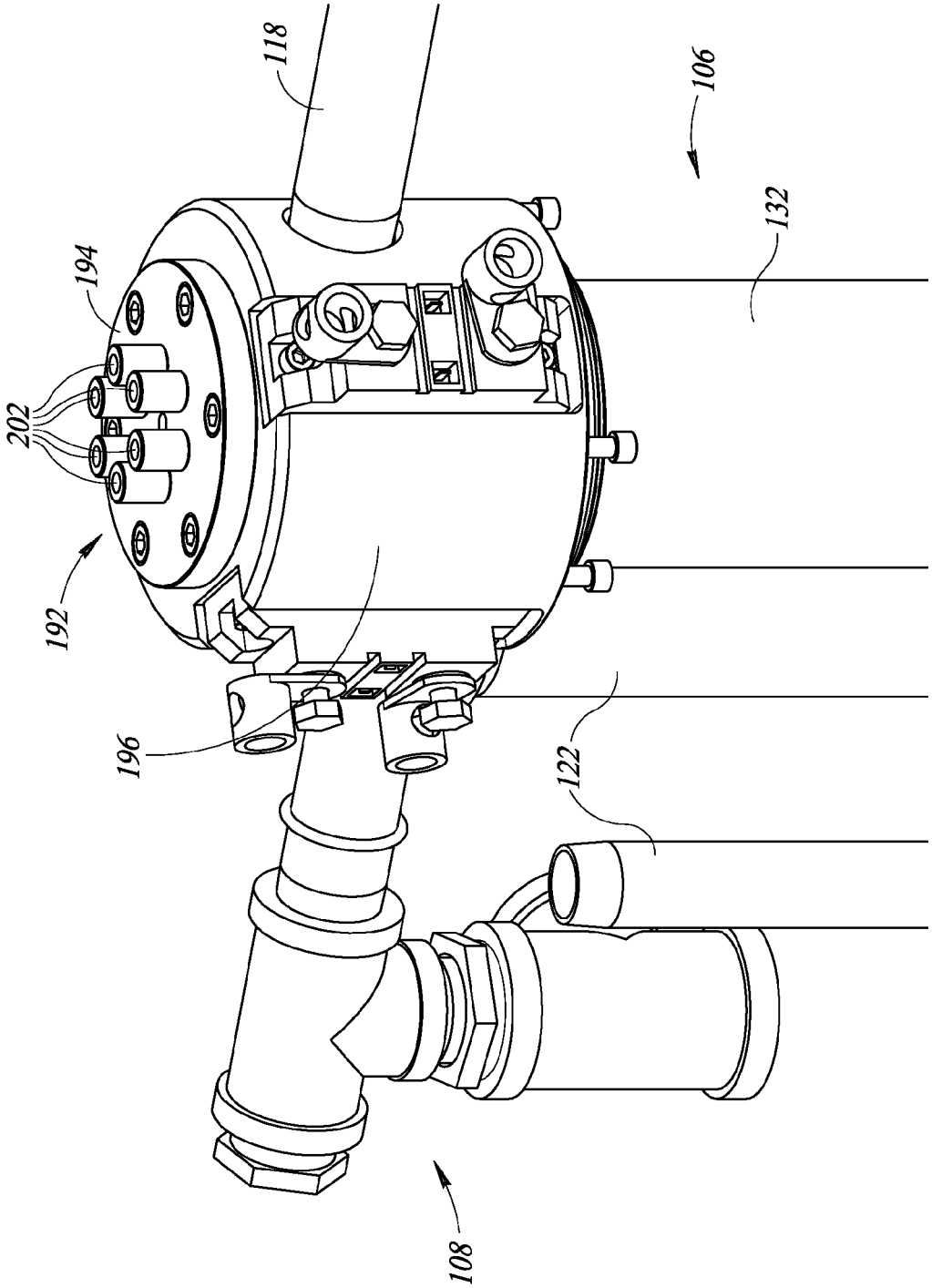

FIG. 9

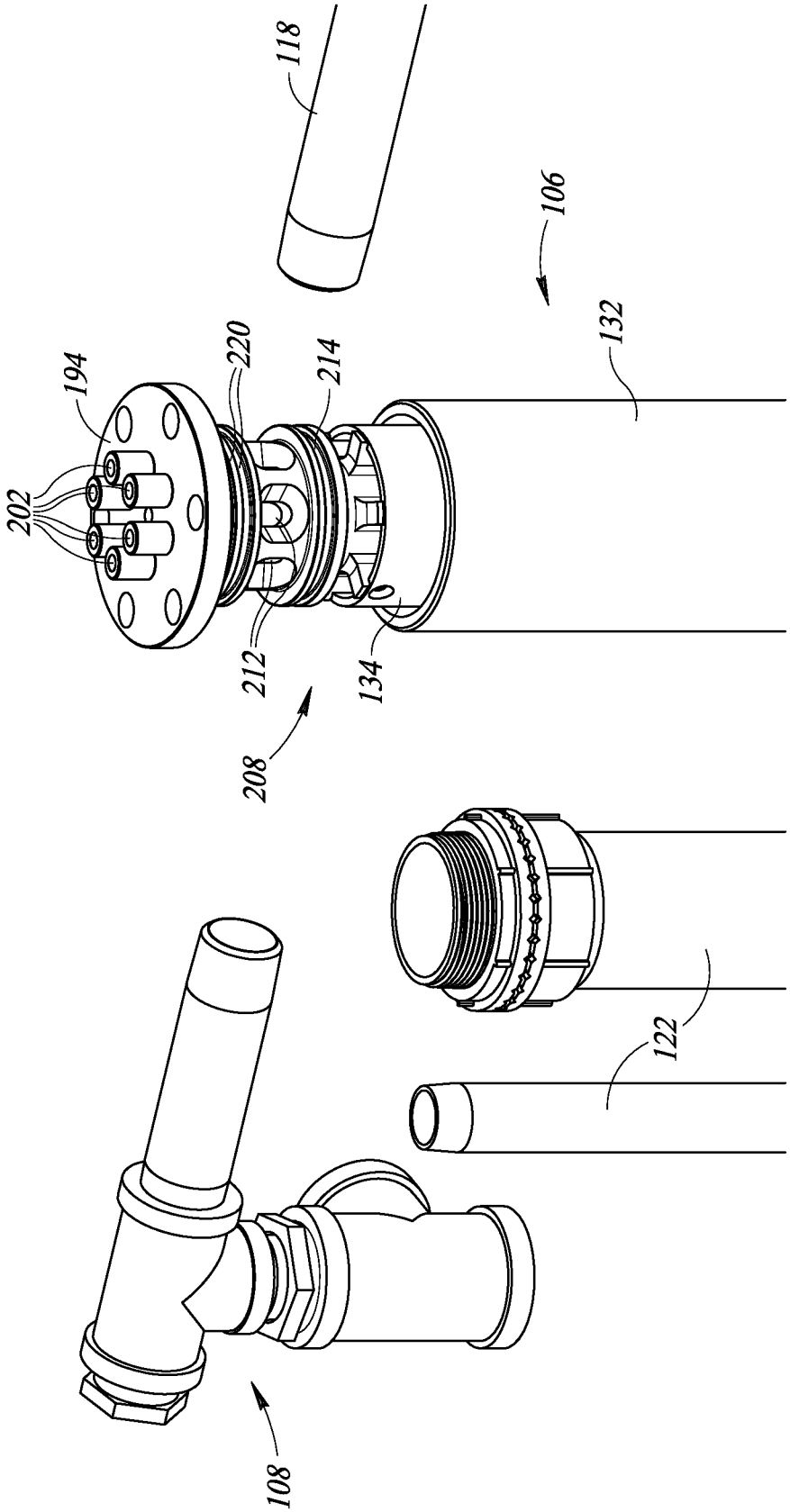

FIG. 10

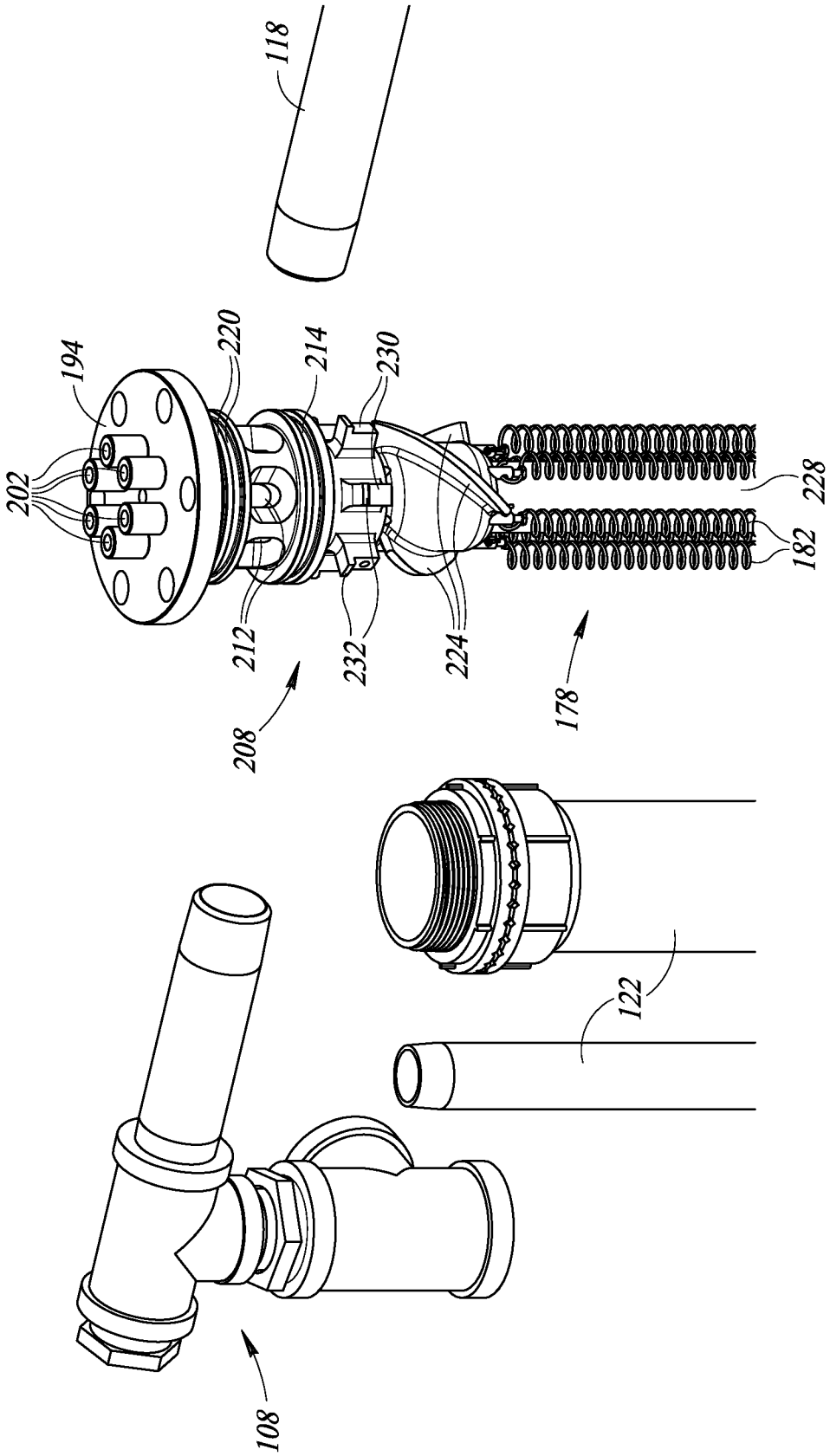

FIG. 11

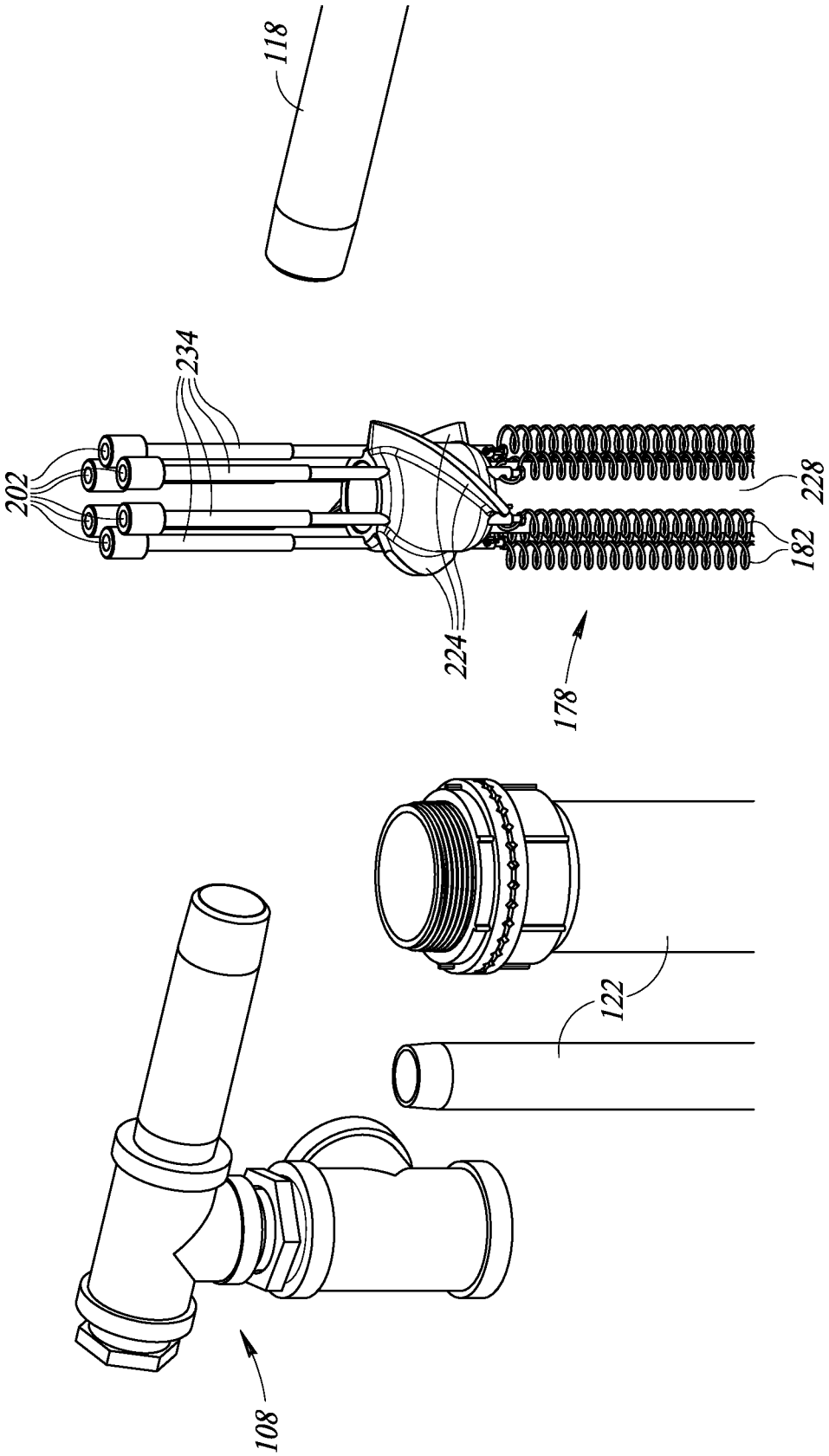

FIG. 12

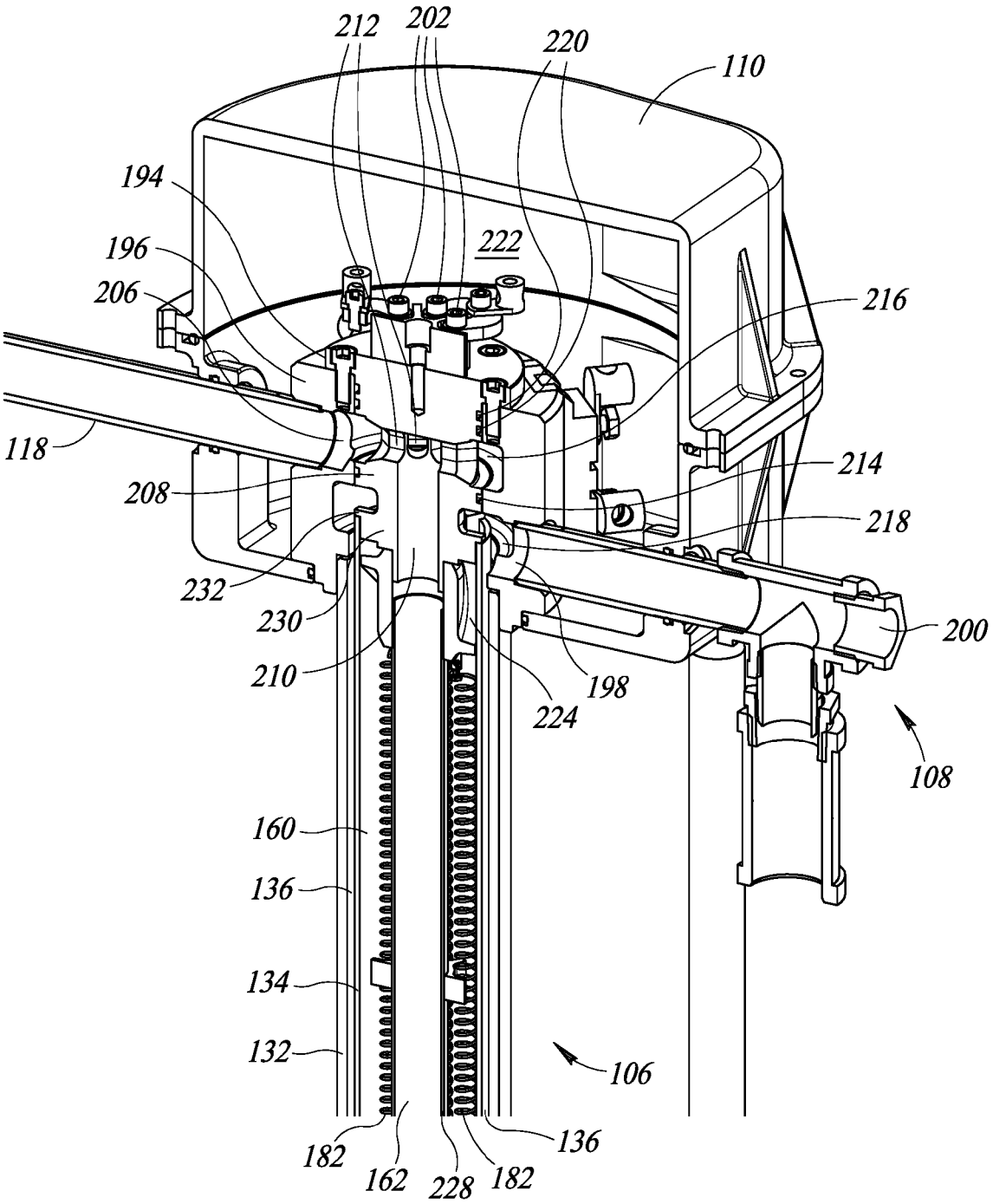
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FIG. 13

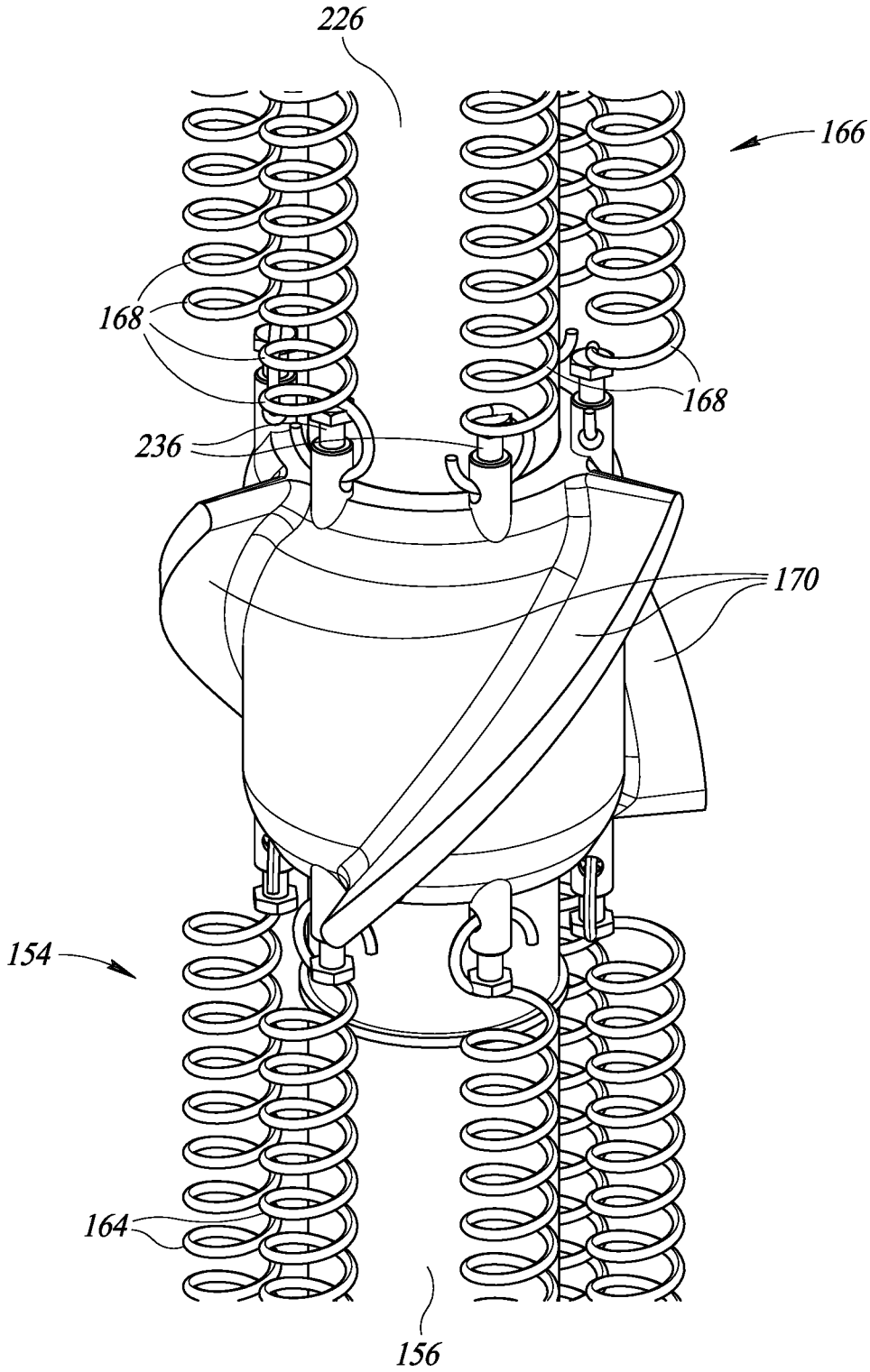

FIG. 14

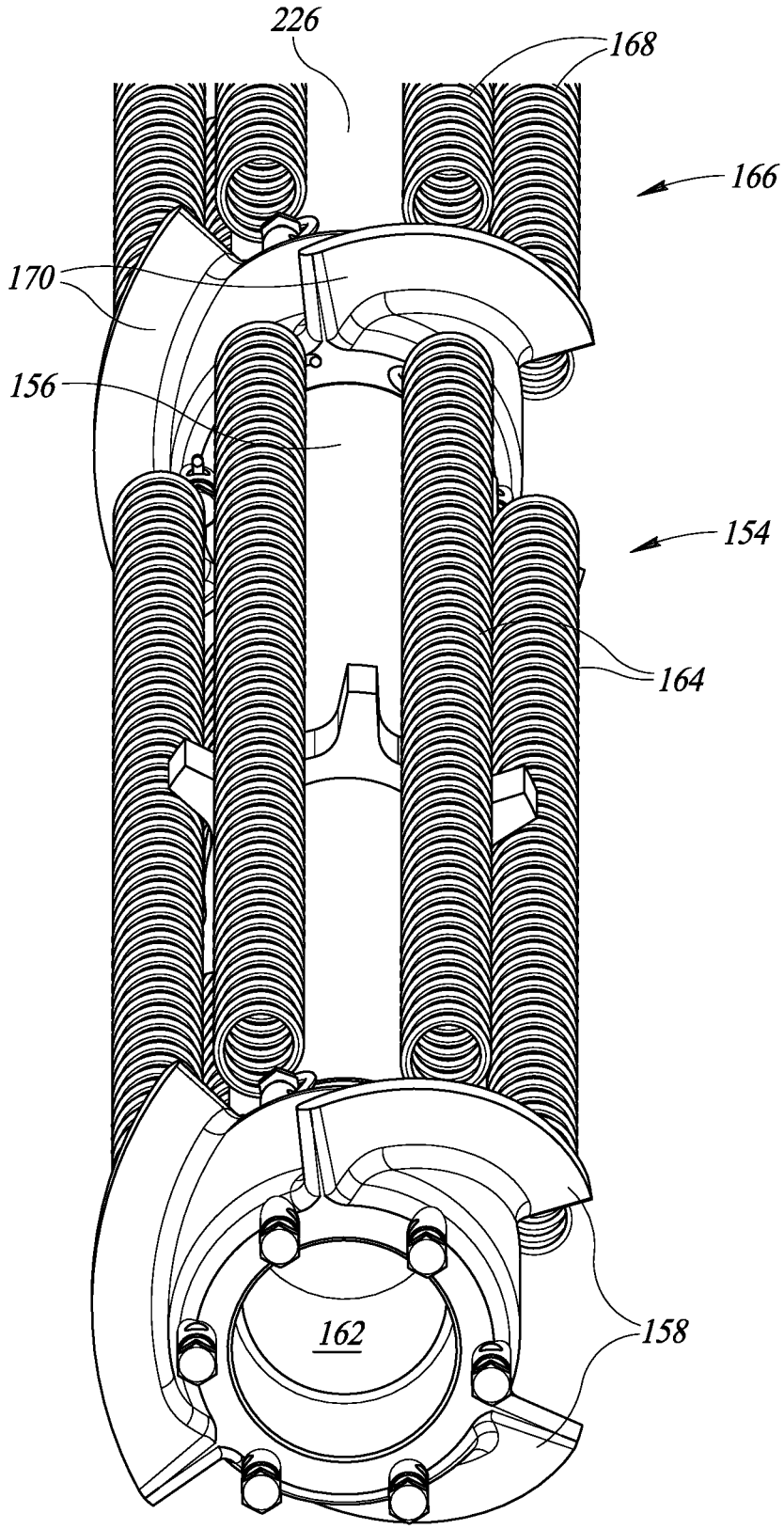

FIG. 15

EMERGENCY SHOWER AND/OR EYEWASH STATION WITH INTEGRATED HEATER

BACKGROUND

[0001] Technical Field

[0002] The present disclosure relates generally to integrated heaters, and more particularly to integrated instantaneous water heaters for use in emergency showers.

[0003] Description of the Related Art

[0004] Various emergency showers are commercially available for use in laboratory, industrial, and other settings in which toxic materials are used or encountered. Some emergency shower systems are designed to meet one or more ANSI standards, to integrate with existing infrastructure, to include eyewash systems, and/or to provide tempered water for rapid decontamination and emergency washing.

BRIEF SUMMARY

[0005] An emergency shower can be summarized as including a column, a water inlet coupled to the column, a water heater positioned inside the column, the water heater in fluid communication with the water inlet, and a shower head in fluid communication with the water heater.

[0006] The emergency shower may further comprise an eyewash assembly in fluid communication with the water heater. The column may include a first pipe and a second pipe arranged concentrically with the first pipe, the first pipe defining an outer surface of a first conduit, and the second pipe defining an outer surface of a second conduit arranged radially outward of the first conduit. The first conduit may be in fluid communication with the second conduit. The second conduit may have an annular profile that extends circumferentially around the first conduit. The column may include a third pipe arranged concentrically with the first pipe and the second pipe and the third pipe may define an outer surface of a third conduit arranged radially outward of the first conduit and the second conduit. The second conduit may be in fluid communication with the third conduit. The third conduit may have an annular profile that extends circumferentially around the first conduit and the second conduit. The water inlet may be in fluid communication with the third conduit.

[0007] The emergency shower may further comprise an eyewash assembly in fluid communication with the water heater. The eyewash assembly may include an eyewash pipe that extends through the third pipe, through the third conduit, through the second pipe, through the second conduit, and through the first pipe.

[0008] An emergency shower can also be summarized as including a column including a top end, a bottom end, an outer pipe, an intermediate pipe positioned within the outer pipe, an inner pipe positioned within the intermediate pipe, an annular outer conduit defined between the intermediate pipe and the outer pipe, an annular intermediate conduit defined between the inner pipe and the intermediate pipe, and an inner conduit defined within the inner pipe, the inner conduit in fluid communication with the intermediate conduit at one end of the inner pipe, and the intermediate conduit in fluid communication with the outer conduit at an opposing end of the intermediate pipe, a lower inlet in fluid communication with the outer conduit and physically coupled to the bottom end of the column, an upper inlet in fluid communication with the outer conduit and physically coupled to the top end of the column, a heating coil positioned within the intermediate conduit, and a shower head in fluid communication with the inner conduit such that a flow path exists from the lower inlet, through the outer conduit to the intermediate conduit, through the intermediate conduit to the inner conduit, and through the inner conduit to the shower head.

[0009] A method of using an emergency shower can be summarized as including: providing a flow of water to an inlet coupled to a column, the inlet in fluid communication with a water heater positioned inside the column and with a shower head coupled to a top end portion of the column; and causing the water to flow into the emergency shower through the inlet, through the water heater, and out of the emergency shower through the shower head by actuating a lever coupled to the emergency shower.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

[0010] FIG. **1** is a perspective view of an emergency shower and eyewash station, according to at least one illustrated embodiment.

[0011] FIG. **2** is another perspective view of the emergency shower and eyewash station of FIG. **1**, according to at least one illustrated embodiment.

[0012] FIG. **3** is a detailed view of some components of the emergency shower and eyewash station of FIG. **1**, according to at least one illustrated embodiment.

[0013] FIG. **4** is a cross-sectional view of some components of the emergency shower and eyewash station of FIG. **1**, according to at least one illustrated embodiment.

[0014] FIG. **5** is a detailed view of some components of the emergency shower and eyewash station of FIG. **1**, according to at least one illustrated embodiment.

[0015] FIG. **6** is another detailed view of some components of the emergency shower and eyewash station of FIG. **1**, according to at least one illustrated embodiment.

[0016] FIG. **7** is another detailed view of some components of the emergency shower and eyewash station of FIG. **1**, according to at least one illustrated embodiment.

[0017] FIG. **8** is another detailed view of some components of the emergency shower and eyewash station of FIG. **1**, according to at least one illustrated embodiment.

[0018] FIG. **9** is a detailed view of some components of the emergency shower and eyewash station of FIG. **1** in a partially disassembled state, according to at least one illustrated embodiment.

[0019] FIG. **10** is another detailed view of some components of the emergency shower and eyewash station of FIG. **1** in a partially disassembled state, according to at least one illustrated embodiment.

[0020] FIG. **11** is another detailed view of some components of the emergency shower and eyewash station of FIG. **1** in a partially disassembled state, according to at least one illustrated embodiment.

[0021] FIG. **12** is another detailed view of some components of the emergency shower and eyewash station of FIG. **1** in a partially disassembled state, according to at least one illustrated embodiment.

[0022] FIG. **13** is a cross-sectional and detailed view of some components of the emergency shower and eyewash station of FIG. **1**, according to at least one illustrated embodiment.

[0023] FIG. **14** is a detailed view of some components of the emergency shower and eyewash station of FIG. **1**, according to at least one illustrated embodiment.

[0024] FIG. **15** is another detailed view of some components of the emergency shower and eyewash station of FIG. **1**, according to at least one illustrated embodiment.

DETAILED DESCRIPTION

[0025] In the following description, certain specific details are set forth in order to provide a thorough understanding of various disclosed embodiments. However, one skilled in the relevant art will recognize that embodiments may be practiced without one or more of these specific details, or with other methods, components, materials, etc. In other instances, well-known structures associated with the technology have not been shown or described in detail to avoid unnecessarily obscuring descriptions of the embodiments.

[0026] As used herein, the terms "up," "down," "top," "bottom," "upper," "lower," and other similar terms of relative elevation generally carry their ordinary meanings, such that, for example, gravity pulls from top to bottom.

[0027] FIGS. **1** and **2** show two different perspective views of an emergency shower **100**. The emergency shower **100** includes a pedestal **102**, a lower inlet **104**, a column **106**, an upper inlet **108**, a cover **110**, control line and utility conduits **122** coupled to a control panel **112**, an eyewash pipe **114** fluidly coupled to an eyewash assembly **116**, and a horizontal shower pipe **118** fluidly coupled to a shower assembly **120**. The emergency shower **100** can be used in laboratory, industrial, or other settings in which toxic materials might be encountered, and can be used to rapidly clean or decontaminate a person working in such an environment.

[0028] As described in greater detail below, the emergency shower **100** includes an integrated instantaneous water heater so that it can be installed in any setting with access to a source of running water, such as water having a temperature between 32 and 100 degrees Fahrenheit, a line pressure between 30 and 90 psi, and a flow rate of at least 25 gallons per minute. The emergency shower **100** can be fluidly coupled to the source of running water such that it is immediately capable of producing a continuous flow of tempered water upon flushing an initial quantity (e.g., the quantity of water sitting in the emergency shower **100** prior to use) of un-tempered water out of the emergency shower **100**.

[0029] FIGS. **3** and **4** show a detailed view and a cross-sectional view, respectively, of the pedestal **102**, the lower inlet **104**, and a bottom portion of the column **106**. The pedestal **102** includes a bottom flange **124** having a peripheral bottom ridge **140** with a flat bottom surface **142** and a plurality of (e.g., three) equidistantly spaced through-holes **126**. The flange **124** can be securely and fixedly coupled to a floor or ground surface, such as by placing its flat bottom surface **142** on the floor or ground surface and fastening the flange **124** to the floor or ground surface using bolts, screws, nails, or other fasteners extending through the holes **126**. In other embodiments, the pedestal **102** can be secured to the floor or ground surface in any suitable way, such as by using any suitable mechanical fastener(s) and/or adhesive(s). The pedestal **102** can taper upwards from the bottom flange **124** toward a neck **128** of the pedestal **102**. The pedestal **102** and its neck **128** can support the rest of the emergency shower **100** such that the emergency shower **100**, and its column **106** in particular, stands vertically with respect to the floor or ground surface.

[0030] The column **106** includes a bottom end cap **130**, a hollow outer casing, sleeve, tube, or pipe, **132** and a hollow intermediate casing, sleeve, tube, or pipe **134** positioned concentrically within the outer pipe **132**. The intermediate pipe **134** and the outer pipe **132** are transparent in FIG. **3** so features of the emergency shower **100** are more clearly illustrated. The bottom end cap **130** is mounted on top of the neck **128** of the pedestal **102**, and the intermediate pipe **134** and the outer pipe **132** are mounted within and on the bottom end cap **130**. Together, the intermediate pipe **134** and the outer pipe **132** form a vertical support post for other components of the emergency shower **100**, as discussed further below. An outer open space, chamber, or conduit, **136** has an annular shape and is defined between the intermediate pipe **134** and the outer pipe **132**, and an inner open space or chamber **138** is defined within the intermediate pipe **134**.

[0031] The bottom end cap **130** includes a bottom portion **148**, a hollow cylindrical side wall **150**, and a through-hole or opening **144** formed in the side wall **150**. As shown in FIG. **4**, the bottom inlet **104** includes an internal conduit **146** that is fluidly coupled, through the opening **144**, to the outer conduit **136**. A bottom end of the intermediate pipe **134** abuts the bottom portion **148** of the bottom end cap **130** so that the inner chamber **138** terminates at the bottom end cap **130**. An internal surface of the side wall **150** includes a groove **152** into which a seal such as a sealing o-ring can be positioned and seated to separate and seal the outer conduit **136** from the inner chamber **138**, so that the outer conduit **136** also terminates at the bottom end cap **130**.

[0032] FIG. **5** illustrates additional portions of the column **106**, with the intermediate pipe **134** and outer pipe **132** still transparent so features of the emergency shower **100** are more clearly illustrated. In particular, FIG. **5** illustrates that a bottom heater **154** is positioned within the intermediate pipe **134**. FIG. **5** illustrates that the bottom heater **154** includes a hollow inner pipe **156** that separates an inner conduit **162** (see FIGS. **13** and **15**) within the inner pipe **156** from an intermediate conduit **160** that has an annular shape and is defined between the inner pipe **156** and the intermediate pipe **134**. The column **106** therefore includes, from a central longitudinal axis of the column **106** moving outwards, the inner conduit **162**, the inner pipe **156**, the intermediate conduit **160**, the intermediate pipe **134**, the outer conduit **136**, and the outer pipe **132**. Each of these components can be co-axial with the others.

[0033] The inner conduit **162** and the intermediate conduit **160** are both in fluid communication with the inner chamber **138** positioned below the bottom heater **154**, such that a fluid can flow from the inner conduit **162** to the intermediate conduit **160**, or from the intermediate conduit **160** to the inner conduit **162**, through the inner chamber **138**. FIG. **5** further illustrates that the bottom heater **154** includes a plurality of helical fins **158** coupled to a bottom end of the inner pipe **156**, and a plurality of (e.g., six) heating elements such as heating coils **164** spaced equidistantly around the inner pipe **156**. In some embodiments, the bottom heater **154** can be positioned so that its helical fins **158** are positioned within the hollow cylindrical side wall **150**. Additional details of the bottom heater **154** are illustrated in FIGS. **14** and **15**.

[0034] FIG. **6** illustrates that a plurality of intermediate heaters **166** are also positioned within the intermediate pipe **134**. The intermediate heaters **166** have features matching those of the bottom heater **154**, and are positioned above the bottom heater **154** within the intermediate pipe **134**. A bottom end of a bottom-most one of the intermediate heaters **166** is coupled to a top end of the bottom heater **154** such that the inner conduit **162** extends through both the bottom heater **154** and the intermediate heaters **166** and such that separation between the inner conduit **162** and the intermediate conduit **160** is maintained along the lengths of the bottom heater **154** and the intermediate heaters **166**. The intermediate heaters **166** each include helical fins **170** at a bottom end thereof, an inner pipe **226**, and a plurality of (e.g., six) heating coils **168**, which can be thermally and/or electrically coupled with the heating coils **164** of the bottom heater **154**, such as through the helical fins **170**.

[0035] FIG. **6** also illustrates the eyewash assembly **116**, which includes an eyewash valve **172** positioned in the eyewash pipe **114** and an eyewash lever **174** coupled to the eyewash valve **172** to actuate the eyewash valve **172** to move between an open configuration and a closed configuration. The eyewash assembly **116** also includes one or more eyewash nozzles **176**, through which water can be discharged to wash a user's eyes when the lever **174** is used to actuate the valve **172** to move to the open configuration so that water can flow from the eyewash pipe **114**, through the eyewash valve **172**, and out of the eyewash nozzles **176**.

[0036] FIG. **6** also illustrates that the eyewash pipe **114** extends through the outer pipe **132**, through the outer conduit **136**, through the intermediate pipe **134**, through the intermediate conduit **160**, and through one of the heaters **166**, including the helical fins **170** and the pipe **226**, to fluidly couple the inner conduit **162** to the eyewash valve **172**, and so that the internal conduit within the eyewash pipe **114** upstream of the eyewash valve **172** can be wet, or filled with water, in advance of the lever **174** being used to actuate the valve **172** to the open configuration.

[0037] FIG. **7** illustrates a top end portion of the column **106**, with the intermediate pipe **134** and the outer pipe **132** still transparent so features of the emergency shower **100** are more clearly illustrated. FIG. **7** illustrates that a top heater **178** is also positioned within the intermediate pipe **134**. The top heater **178** has features matching those of the bottom and intermediate heaters **154**, **166**, and is positioned above the intermediate heaters **166** within the intermediate pipe **134**. A bottom end of the top heater **178** is coupled to a top end of a top-most one of the intermediate heaters **166** such that the inner conduit **162** extends through each of the bottom heater **154**, the intermediate heaters **166**, and the top heater **178**, and such that separation between the inner conduit **162** and the intermediate conduit **160** is maintained across the lengths of the heaters. The top heater **178** includes helical fins **180** at a bottom end thereof, an inner pipe **228**, and a plurality of (e.g., six) heating coils **182**, which can be thermally and/or electrically coupled with the heating coils **168** of the intermediate heaters **166**, such as through the helical fins **180**.

[0038] FIG. **8** illustrates that the shower assembly **120** includes a shower valve **184** positioned in the shower pipe **118**, as well as a shower lever **186** and a shower handle **190** coupled to the shower valve **184** to actuate the shower valve **184** to move between an open configuration and a closed configuration. The shower assembly **120** also includes a shower head **188**, through which water can be discharged to wash a user when the shower handle **190** is pulled to actuate the lever **186** to move the valve **184** to the open configuration so that water can flow from the shower pipe **118**, through the shower valve **184**, and out of the shower head **188**. The internal conduit within the shower pipe **118** upstream of the shower valve **184** can be wet, or filled with water, in advance of the lever **186** being used to actuate the valve **184** to the open configuration.

[0039] FIG. **9** illustrates a top end portion of the column **106**, with the emergency shower **100** partially disassembled so features of the emergency shower **100** are more clearly illustrated. In particular, FIG. **9** illustrates the top end portion of the column **106** with the cover **110** removed. FIG. **9** illustrates that the column **106** includes a top end cap **192**, which includes a top plate **194**, a hollow cylindrical side wall **196**, an inlet through-hole or opening **198** (see FIG. **13**) formed in the side wall **196**, and out outlet through-hole or opening **206** (see FIG. **13**). The upper inlet **108** has features matching those of the lower inlet **104**, including an internal conduit **200** (see FIG. **13**) that is fluidly coupled, through the opening **198**, to the outer conduit **136**.

[0040] FIG. **9** also illustrates that a plurality of (e.g., six) leads **202**, which are thermally and/or electrically coupled to the heating coils **182**, extend, in a watertight fashion, through the top plate **194** of the top cap **192**. The leads **202** can be further coupled, such as by wires extending through one of the control line and utility conduits **122**, to the control panel **112**, which can include an on/off switch and a control system for the emergency shower **100**, as described further below.

[0041] FIG. **10** illustrates the top end portion of the column **106** of FIG. **9**, with the emergency shower **100** further disassembled so features of the emergency shower **100** are more clearly illustrated. In particular, FIG. **10** illustrates the top end portion of the column **106** with the cylindrical side wall **196** of the top end cap **192** removed. FIG. **10** illustrates that the column **106** includes an outlet manifold **208** positioned within the top end cap **192**. The outlet manifold **208** includes a vertical central internal conduit **210** (see FIG. **13**) that extends upwardly through the manifold **208** and splits into a plurality of horizontal conduits **212** extending radially outward from the central internal conduit **210**.

[0042] The outlet manifold **208** includes a lower peripheral groove **214** that extends circumferentially around the manifold **208**, within which a sealing element such as a sealing o-ring can be seated to separate an upper chamber **216** (see FIG. **13**) of the top cap **192** from a lower chamber **218** (see FIG. **13**) of the top cap **192**. The outlet manifold **208** also includes one or more upper peripheral grooves **220** that extend circumferentially around the manifold **208**, within which respective sealing elements such as sealing o-rings can be seated to separate the upper chamber **216** (see FIG. **13**) of the top cap **192** from an external environment of the top cap **192**, such as an open space **222** within the cover **110**.

[0043] FIG. **11** illustrates the top end portion of the column **106** of FIG. **9**, with the emergency shower **100** further disassembled so features of the emergency shower **100** are more clearly illustrated. In particular, FIG. **11** illustrates the top end portion of the column **106** with the outer pipe **132** and the intermediate pipe **134** removed. FIG. **11** illustrates that the top heater **178** includes a plurality of

helical fins **224** coupled to a top end of the inner pipe **228**. FIG. **11** further illustrates that the manifold **208** includes a plurality of protrusions or fins **230** extending radially outward, and an upper lip **232** protruding further radially outward from a top end of each of the fins **230**. When the emergency shower **100** is assembled, the intermediate pipe **134** can be seated or abutted against the outer surfaces of the fins **230** and the undersides of the lips **232** such that the intermediate conduit **160** extends upwards between the fins **230** into the lower chamber **218**.

[0044] FIG. **12** illustrates the top end portion of the column **106** of FIG. **9**, with the emergency shower **100** further disassembled so features of the emergency shower **100** are more clearly illustrated. In particular, FIG. **12** illustrates the top end portion of the column **106** with the manifold **208** and the top plate **194** removed. FIG. **12** illustrates that the leads **202** are thermally and/or electrically coupled to the heating coils **182** via cables, wires, or pipes **234**, which extend from the leads **202**, through the helical fins **224**, to the heating coils **182**.

[0045] FIG. **13** illustrates a cross-sectional view of a top end portion of the column **106**, including various conduits and chambers located at the top end portion of the column **106**. FIG. **13** also illustrates that the top plate **194** can be integrally formed with the outlet manifold **208**. FIG. **14** illustrates additional details of the connection between the heating coils **164** of the bottom heater **154** and the heating coils **168** of a bottom-most one of the intermediate heaters **166**. For example, the heating coils **164** are thermally and/or electrically coupled to the heating coils **168** via cables, wires, or pipes **236**, which extend through the helical fins **170**. FIG. **15** illustrates the bottom heater **154** and the bottom-most one of the intermediate heaters **166** from underneath, and shows an entrance to the inner conduit **162** at a bottom end of the bottom heater **154**.

[0046] The emergency shower **100** can be sold and shipped to an installation location as a single, assembled unit. Once received at the installation location, the emergency shower **100** can be fluidly coupled to a source of water, such as a source of cold water, and electrically coupled to a source of electric power. As examples, a source of water can be fluidly coupled to the lower inlet **104** and the upper inlet **108** can be capped, or the source of water can be fluidly coupled to the upper inlet **108** and the lower inlet **104** can be capped, or the source of water can be fluidly coupled to both the lower inlet **104** and the upper inlet **108**, or a first source of water can be coupled to the lower inlet **104** and a second source of water can be coupled to the upper inlet **108**. Further, a source of electric power can be electrically coupled to the control panel **112**. The emergency shower **100** can then be ready for use, without being coupled to a separate water heater.

[0047] When the emergency shower **100** is in use, electricity is drawn from the source of electric power, through the control panel, and to the heating coils **182**, **168**, and **164**, where it is used to heat the heating coils and thereby to heat water flowing through the emergency shower **100**. Water flows from the source of water into the emergency shower through the lower inlet **104**, the upper inlet **108**, or both. Water flowing in through the lower inlet **104** flows upwards through the column **106** through the outer conduit **136** until it reaches the lower chamber **218** within the top cap **192**. Water flowing in through the upper inlet **108** flows directly into the lower chamber **218**. The water then flows from the lower chamber **218**, over the top of the intermediate pipe **134**, and down between the fins **230** into the intermediate conduit **160**. The water then flows down through the intermediate conduit **160** until it reaches the inner chamber **138** at the bottom of the column **106**.

[0048] As the water flows down through the conduit **160**, it flows past the heating coils **182**, **168**, and **164**, and heat energy is transferred from the heating coils **182**, **168**, and **164** to the water, heating the water. The water also flows past the helical fins **224**, **180**, **170**, and **158**, which cause the water to rotate and mix as it moves down through the conduit **160**, to improve the consistency of the temperature of the water. Once the water reaches the inner chamber **138** at the bottom of the column **106** below the bottom heater **154**, the water flows around the bottom end of the bottom heater **154** and upward through the inner conduit **162** (see FIG. **15**) extending through the inner pipe **156** of the bottom heater **154**, through the inner pipes **226** of the intermediate heaters **166**, and through the inner pipe **228** of the top heater **178**, into the vertical central internal conduit **210** within the manifold **208**.

[0049] Once in the manifold **208**, the water is distributed radially outward through the plurality of horizontal conduits **212** into the upper chamber **216** of the top cap **192**. From the upper chamber **216** of the top cap **192**, the water can flow out of the top cap **192** through the opening **206** into the shower pipe **118**. When the shower valve **184** is open, the water can flow out of the shower pipe **118** and through the shower head **188**.

[0050] A method of operation for the emergency shower **100** includes receiving a signal that use of the emergency shower **100**, such as use of the shower assembly **120** or the eyewash assembly **116**, is desired by a user. The user can provide this signal by actuating one or both of the levers **174**, **186**. The method further includes opening the respective valve(s) **172**, **184** to allow water to flow out of the emergency shower **100** for use by the user. The method further includes, upon receipt of the signal, turning on the heating coils of the emergency shower **100** to begin heating the water flowing through the emergency shower **100**. The method further includes measuring a temperature of the heated water, such as by using a thermometer, thermistor, or other temperature sensor positioned within the upper chamber **216** of the top cap **192**, positioned within the eyewash pipe **114**, and/or positioned within the inner chamber **138** to monitor the temperature of the water leaving the emergency shower **100**.

[0051] The method further includes using the measured temperature to control operation of the heating coils of the emergency shower **100** to maintain the temperature of the water leaving the emergency shower **100** at a desired temperature. For example, the emergency shower **100** includes an electronic control system, such as within the control panel **112** and including a microcontroller, which can have a baseline target temperature stored in memory, which can receive a signal indicating the measured temperature, and which can control an amount of electrical power supplied to the heating coils of the emergency shower **100** based on a comparison of the measured temperature with the baseline target temperature. For example, if the measured temperature is lower than the target temperature, then the control system can increase the electric power provided to the heating coils, whereas if the measured temperature is higher than the target temperature, then the control system can

decrease the electric power provided to the heating coils. The baseline target temperature can be any desired temperature, with 85 degrees Fahrenheit being one example.

[0052] The emergency shower **100** can draw and consume about 150 kW of electric power, at about 480 V or about 600 V. The emergency shower **100** can heat water flow at about 25 gallons per minute by about 45 degrees Fahrenheit, such as from 40 degrees Fahrenheit to about 85 degrees Fahrenheit. The emergency shower **100** can be insulated so that it can be used in extremely cold environments, such as in Canadian oil fields or in Antarctica. For example, the emergency shower **100** can be installed in a frozen environment or an environment below 32 degrees Fahrenheit, and the source of water for the emergency shower **100** can be a pipeline below the frost line. The entire emergency shower **100** can be insulated to a degree sufficient to ensure that the rate at which heat can be transferred from the source of water to the emergency shower is greater than the rate at which heat dissipates from the emergency shower **100** to the surrounding environment.

[0053] Thus, no additional heating elements, and no heat tracing, is needed to prevent the emergency shower **100** or any components thereof from freezing. In some embodiments, if a signal provided by a temperature sensor incorporated into the emergency shower, such as a thermometer or a thermistor, indicates that an internal temperature of the emergency shower **100** has fallen below a first threshold value (e.g., 35 or 40 degrees Fahrenheit), then one or more of the heaters **178**, **166**, and **154** can be turned on until the internal temperature rises to a second threshold value (e.g., 40 or 45 degrees Fahrenheit). In some embodiments, if a signal provided by a temperature sensor monitoring an environmental temperature around the emergency shower **100** indicates that the environmental temperature has fallen below a threshold value, then one or more of the heaters **178**, **166**, and **154** can be pulsed on and off, at a frequency and for a duration that can vary with the measured environmental temperature. The emergency shower **100** can conform to one or more industry standards for emergency showers, such as ANSI/ISEA Z358.1 and/or UL 499.

[0054] The emergency shower **100** is integrated with an instantaneous water heater including the heaters **178**, **166**, and **154**. While the emergency shower **100** includes five such heaters, any number of heaters can be used, such as a single one, two, three, four, five, six, or more heaters positioned within the intermediate pipe **134**. Further, while the emergency shower **100** includes the heating coils **164**, **168**, and **182** positioned between the inner pipes **156**, **226**, and **228** and the intermediate pipe **134**, the heating coils **164**, **168**, and **182** can take other forms and be located in different positions within the flow path of the water through the emergency shower **100**. Further still, while the emergency shower **100** is described as being used with water, other fluids can be used and can flow through the same conduits and chambers as described herein for water.

[0055] U.S. Provisional Patent Application No. 62/266,191, filed Dec. 11, 2015, to which this application claims priority, is hereby incorporated by reference in its entirety. The various embodiments described above can be combined to provide further embodiments. These and other changes can be made to the embodiments in light of the above-detailed description. In general, in the following claims, the terms used should not be construed to limit the claims to the specific embodiments disclosed in the specification and the claims, but should be construed to include all possible embodiments along with the full scope of equivalents to which such claims are entitled. Accordingly, the claims are not limited by the disclosure.

1. An emergency shower comprising:
a column;
a water inlet coupled to the column;
a water heater positioned inside the column, the water heater in fluid communication with the water inlet; and
a shower head in fluid communication with the water heater.

2. The emergency shower of claim **1**, further comprising an eyewash assembly in fluid communication with the water heater.

3. The emergency shower of claim **1** wherein the column includes a first pipe and a second pipe arranged concentrically with the first pipe, the first pipe defines an outer surface of a first conduit, and the second pipe defines an outer surface of a second conduit arranged radially outward of the first conduit.

4. The emergency shower of claim **3** wherein the first conduit is in fluid communication with the second conduit.

5. The emergency shower of claim **3** wherein the second conduit has an annular profile that extends circumferentially around the first conduit.

6. The emergency shower of claim **3** wherein the column includes a third pipe arranged concentrically with the first pipe and the second pipe and the third pipe defines an outer surface of a third conduit arranged radially outward of the first conduit and the second conduit.

7. The emergency shower of claim **6** wherein the second conduit is in fluid communication with the third conduit.

8. The emergency shower of claim **6** wherein the third conduit has an annular profile that extends circumferentially around the first conduit and the second conduit.

9. The emergency shower of claim **6** wherein the water inlet is in fluid communication with the third conduit.

10. The emergency shower of claim **6**, further comprising an eyewash assembly in fluid communication with the water heater.

11. The emergency shower of claim **10** wherein the eyewash assembly includes an eyewash pipe that extends through the third pipe, through the third conduit, through the second pipe, through the second conduit, and through the first pipe.

12. An emergency shower comprising:
a column including a top end, a bottom end, an outer pipe, an intermediate pipe positioned within the outer pipe, an inner pipe positioned within the intermediate pipe, an annular outer conduit defined between the intermediate pipe and the outer pipe, an annular intermediate conduit defined between the inner pipe and the intermediate pipe, and an inner conduit defined within the inner pipe, the inner conduit in fluid communication with the intermediate conduit at one end of the inner pipe, and the intermediate conduit in fluid communication with the outer conduit at an opposing end of the intermediate pipe;
a lower inlet in fluid communication with the outer conduit and physically coupled to the bottom end of the column;
an upper inlet in fluid communication with the outer conduit and physically coupled to the top end of the column;

a heating coil positioned within the intermediate conduit; and

a shower head in fluid communication with the inner conduit such that a flow path exists from the lower inlet, through the outer conduit to the intermediate conduit, through the intermediate conduit to the inner conduit, and through the inner conduit to the shower head.

13. A method of using an emergency shower comprising:

providing a flow of water to an inlet coupled to a column, the inlet in fluid communication with a water heater positioned inside the column and with a shower head coupled to a top end portion of the column; and

causing the water to flow into the emergency shower through the inlet, through the water heater, and out of the emergency shower through the shower head by actuating a lever coupled to the emergency shower.

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