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R. A. JOHNSTONE
ELECTRIC WATER HEATER

2,420,175

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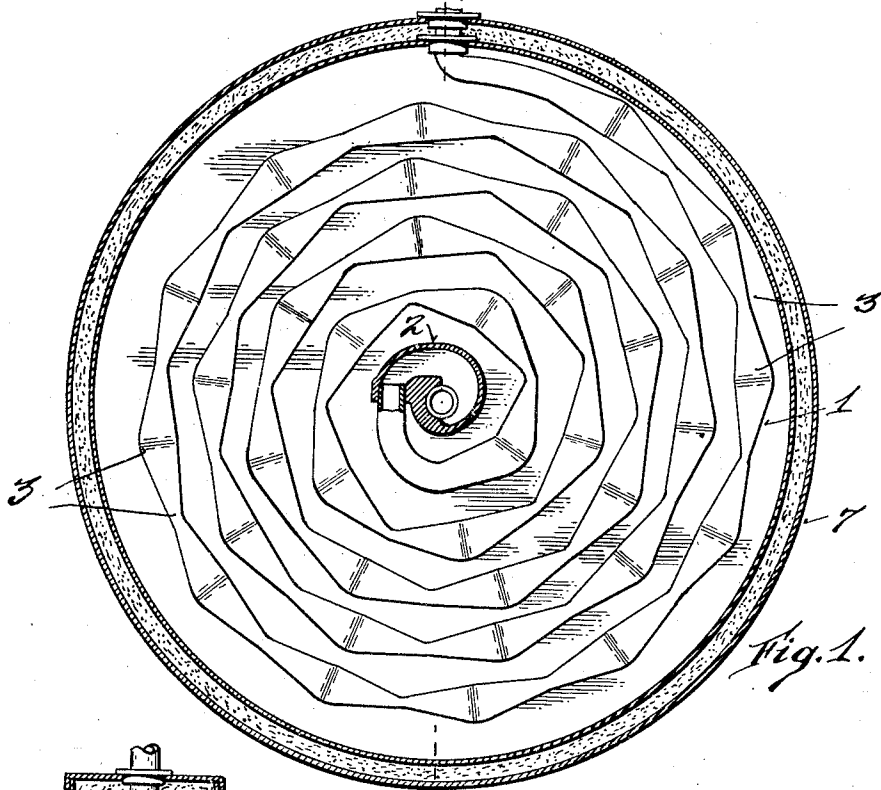


Fig. 1.

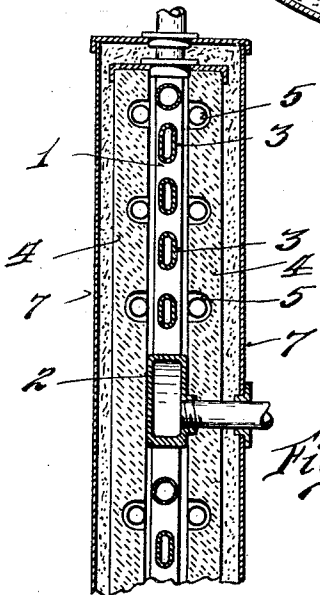


Fig. 2.

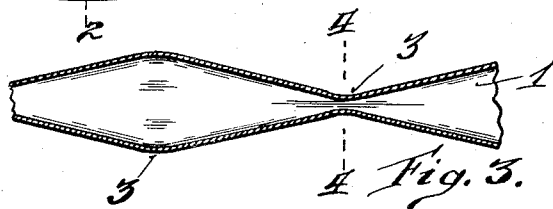


Fig. 3.

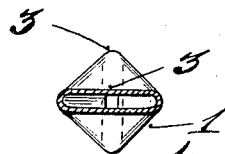


Fig. 4.

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ELECTRIC WATER HEATER

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6 Claims. (Cl. 219—39)

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This invention relates to improvements in electric water heaters primarily for non-storing domestic service, to heat the water flowing through a distributing or conductor line for a period the line is open for water connection.

An object of the invention is to provide a tubular water locating coil interposed between electric heater units, the tube alternately indented or compressed at intervals to condense or flatten its passage for effecting relatively opposite angular or tapering intervals, to divergently spread the water stream for increasing its rate of heat absorption, and ruffle its flow, thereby heat the moving stream of water to a higher degree of temperature for a given volume and period than would be otherwise possible. It also provides for an increased area of exposure, more direct to the heat radiating or dissipated from the electric heating units disposed externally of and at opposite sides of the water coil and with the water coil are housed within a heat insulation lined enclosure.

Various other features and advantages of the invention will be more fully set forth in the following description of the accompanying drawings, forming a part hereof and depicting a preferred embodiment, in which:

Figure 1 is a plan view of the tubular water heating coil.

Figure 2 is a central section through the water heater unit, taken on line 2, Figure 1.

Figure 3 is an enlarged central longitudinal section of a portion of the water coil tubing.

Figure 4 is a section on line 4—4, Figure 3.

Referring to the drawings, 1 indicates a water heating coil, comprising a tube, spirally bent, with the convolutions in a common plane, with its inner end, as an inlet connecting with a hollow fitting 2, as the axis for the coil and to which a water service pipe or conductor connects and extends laterally therefrom. The outlet end preferably extends radially from the core, which however is optional. The number of coil convolutions is optional and governed by the capacity and size of unit.

The tubing at determined intervals is indented or compressed in relative alternate arrangement progressively, for its length, to flatten its passage from a cylindrical to an oblong contour, to spread and level the water stream flowing therethrough materially stimulating and speeding its heat absorption. In alternately indenting or compressing the tube, the flattened portions 3, progressively are relatively angularly disposed, and as shown, preferably, each at right

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angles to the next in order and the distance spacing from center to center for a water supply pipe size for a conventional household plumbing fixture for example, averages about one and one-half inches apart. This tends to spiral the flow and ruffle the water materially increasing the rate and degree of heating for a determined volume and rate of flow in the relatively short period it moves through the heating zone. The structure of the coil at a full volume and rate of flow will heat the water above the usual average temperature required for bath and household sink service and at a comparatively reduced kilowatt electric energy demand to be economical.

The water heating coil is disposed between a pair of electric heater units 4, 4, of conventional construction, and as illustrated each comprises a coiled wire heating element 5, imbedded in a spiral groove or channel in a face side of a refractory plate or disk, with the heating element adjoining the water coil, either suitably spaced or insulated therefrom. The water coil and heating unit may be bound together by an annular rim and enclosed in a suitable casing 7, heat insulation lined.

The heating elements when the unit is installed are in electric circuit connection with an automatic waterflow controlled switch, not illustrated, for appropriately cutting on and off the electric power, coincidentally with the water service control, as by a valve of the plumbing fixture and through which the water flow and consequently the temperature can also be controlled.

The heater is compact and efficient and can be installed directly in an exposed section of a water conductor line as for a laboratory or other type of domestic or household plumbing fixture.

Having described my invention, I claim:

1. A non-storing domestic water heater, comprising: a water heating tubular coil, with the convolutions of the coil in a common plane, the tube depressed and flattened at determined spaced intervals to alternately convert the same from a cylindrical to an oblong contour, to thinly spread and level the water passage, an electric heater unit of flat form, one respectively disposed at each of the opposite sides of the water coil and a heat insulation lined casing enclosing said coil and electric heater units.

2. A non-storing domestic water heater, comprising: a water heating tubular coil, with the convolutions of the coil in a common plane, the tube depressed and flattened at determined spaced intervals, to alternately convert the same

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from a cylindrical to an oblong contour to thinly spread and level the water passage, the flattened portions in their consecutive order relatively at an angle to one another, an electric heater unit of flat form, one respectively disposed at each of the opposite sides of the water coil and a heat insulation lined casing enclosing said coil and electric heater units.

3. A water heater, comprising: a tubular water conducting coil of flat form, electric heater elements at relative opposite sides of the coil, the length of the tube of the coil depressed at intervals to spread and flatten the same and a heat insulation lined casing enclosing said water conducting coil and electric heating elements.

4. A water heater, comprising: a tubular water conducting coil of flat form, the length of the tube of the coil depressed at intervals to converge its walls, electric heater elements external of the coil and at opposite sides thereof and an insulation lined casing enclosing said coil and electric heating elements.

5. A water heater, comprising: a tubular water conducting coil of flat form, the length of the tube of the coil depressed at intervals to converge its walls and oblong the contour and bore of the tube cross-wise thereof and consecutively relative at different angles, electric heater ele-

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ments external of the coil and at opposite sides thereof and an insulation lined casing enclosing said coil and electric heating elements.

6. A water heater comprising: a tubular water conducting tube of flat spiral form, the tube deformed at intervals to oblong its contour and bore transversely of the tube successively relatively at right angles to one another and opposing converging the tube between consecutive intervals, electric heater units respectively disposed at relative opposite sides of the coil and a casing enclosing coil and electric heater units.

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