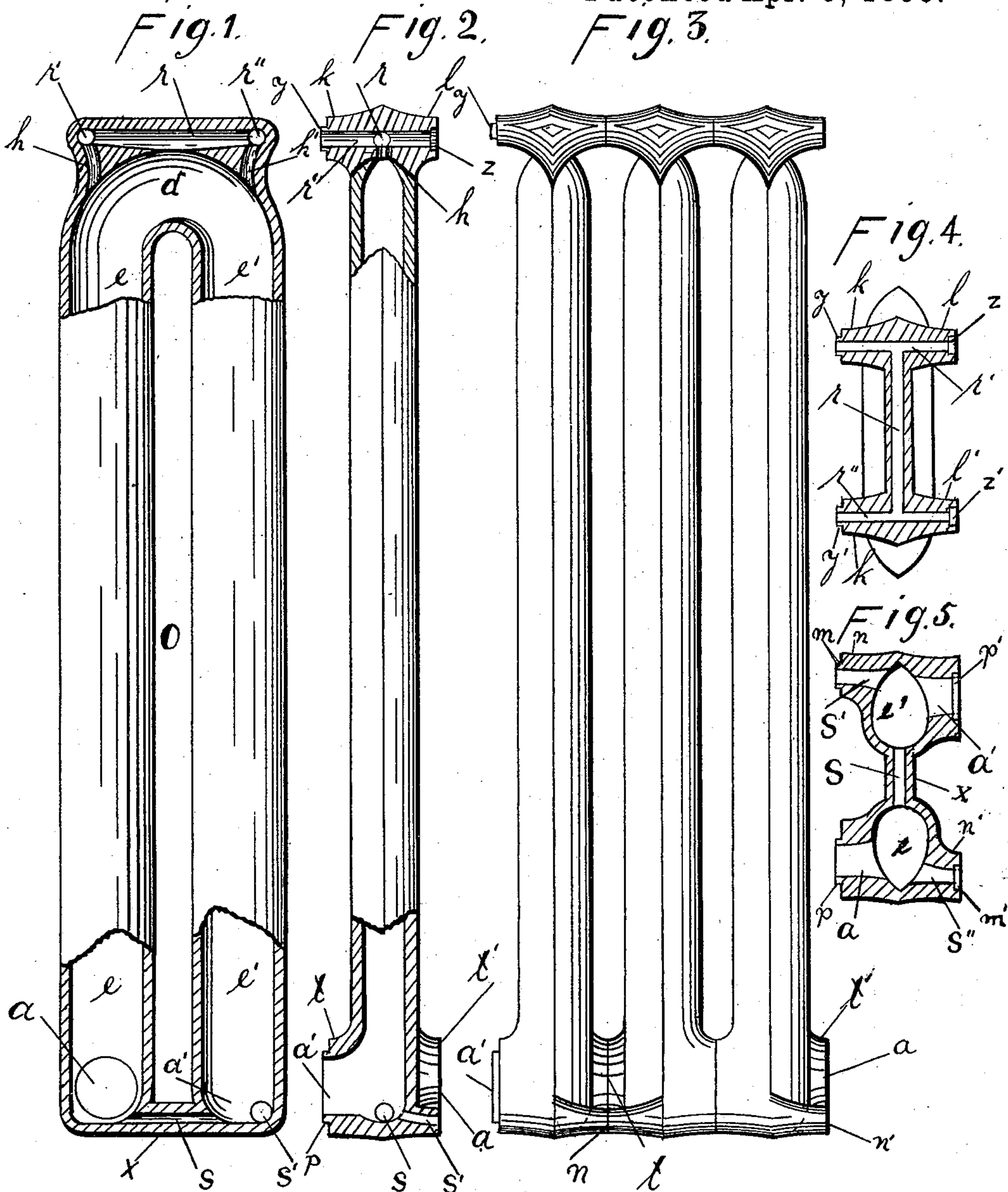


(No Model.)

J. T. JACKSON & F. J. TRAVERS.
STEAM OR HOT WATER RADIATOR.

No. 601,656.

Patented Apr. 5, 1898.



Witnesses.

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STEAM OR HOT-WATER RADIATOR.

SPECIFICATION forming part of Letters Patent No. 601,656, dated April 5, 1898.

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To all whom it may concern:

Be it known that we, JOHN THOMAS JACKSON, mechanical engineer, and FERGUS JAMES TRAVERS, subjects of the Queen of Great Britain, residing in the city of Toronto, in the county of York, in the Province of Ontario, Canada, have invented certain new and useful Improvements in Steam or Hot-Water Radiators, in which a positive and constant circulation of steam and hot water is sustained, of which the following is a specification.

This invention relates to certain new and useful improvements in or relating to steam and hot-water heating-radiators; and the objects of the invention are as follows: first, to provide a radiator with a direct circulation and one having a uniform temperature throughout its entire length; second, to provide a radiator that is adapted for use either in a vertical or horizontal position and one so constructed that in either position the same will drain and ventilate; third, to provide a radiator having at the top of the loops thereof a transverse passage connected at either end by vertical passages with the upper chamber of the loops, and said transverse passage is also connected with longitudinal passages and by means of the said passages the stagnant air may be drawn off the entire radiator whether the same is placed in a vertical or horizontal position and whether the radiator-loops are placed on their side or their edge; fourth, to provide a radiator having at its feed end four connections—drainage and feed connections on one leg of the loop and feed and drainage on the other—the same being arranged alternately; fifth, to provide a radiator that is especially constructed for use in a room where the radiator cannot be used in a vertical position, but only in a horizontal position, such as under the floor, and one that is so constructed that it can be fed, drained, and vented while in a horizontal position and one that will be of a uniform temperature throughout and free from air-cushioning; sixth, to provide a radiator-loop having at each side thereof two connections at the top and two at the bottom that are in circulation with each other and with the interior chambers of the said loops; seventh, to provide a radiator-loop having drainage,

air, and feed openings therein so constructed that the same can be drained, ventilated, and fed whether in a vertical or horizontal position; eighth, to provide a radiator that is equally adapted for use either in a steam or hot-water system.

The invention consists, essentially, of the device hereinafter more fully set out and more particularly pointed out in the claims.

In the drawings, Figure 1 shows a face view, cut in section, of a circulating loop or column. Fig. 2 shows an edge view, cut in section, of a circulating loop or column. Fig. 3 shows several loops of the radiator arranged in position. Fig. 4 shows a top cross-sectional view of the air-vent. Fig. 5 shows a cross-sectional view of the drainage and feed.

Like letters of reference refer to like parts throughout the specification and drawings.

O represents one of the loops in which are formed two chambers or water-legs *e* and *e'*. The water-leg *e* is located in the feed side of the radiator-loop and the water-leg *e'* in the return side of the radiator-loop. The entrance to the water-leg *e* is surrounded by a hub *t*, Fig. 2, said water-leg *e* commencing with a right-angle bend or elbow at the bottom of the radiator-loop and is in circulation with the water-leg *e'* at *d*. The water-leg *e'* terminates or ends at the lower and return end of the radiator-loop at *a'* with a right-angle bend in the opposite direction of the right-angle bend at the beginning of the water-leg *e* and at the opposite side of the loop from the feed-opening *a*. At the bottom of the said loop O is a brace X, holding the lower ends of the loop rigid. Within said brace X is an interior passage *s*, which said interior passage *s* is in circulation at the lower end of the radiator-loop with the water-legs *e* and *e'* at the right-angle bends or elbows.

At the extreme bottom of the water-legs *e* and *e'* and on the opposite sides to the ports *a* and *a'* are placed small hubs *n* and *n'* with passages therein in circulation with the water-legs *e* and *e'* at the back of the right-angle bends in said water-legs.

The hub *t* is fitted with a male coupling *p*, which is adapted to fit into a female coupling *p'* in hub *t'* at the return end of the water-leg *e'* of the next adjacent loop. The female

coupling p' is adapted to receive a compressible ring or gasket to prevent leakage.

The hub n is fitted with a male coupling m , which is adapted to fit into a female coupling m' in hub n' at the return end of the water-leg e' , which is on the opposite side from the feed-opening a of the next adjacent loop. The female coupling m' is adapted to receive a compressible ring or gasket to prevent leakage.

By means of the passage s the lower end of the water-leg e is placed in circulation with the lower end of the water-leg e' , and the condensation from steam in the water-leg e can pass either through the opening s or around the end d into the water-leg e' , and from thence through the drainage-openings s' and s'' or through the return-port a' to the next adjacent loop and then to the flow or return pipe.

By means of the passages s , s' , and s'' the condensation from steam or otherwise may pass from one end of the radiator to the other—that is, from the feed to the return end in case the radiator is used on a two-pipe system or from the return to the feed end in case the radiator is used on a one-pipe system—and by means of the said passages s , s' , and s'' the said radiator can be drained of condensation and also can be emptied of water when desired. These radiator-loops are connected at the bottom in two places, the water-leg e of the loop O connecting with the water-leg e' of the next adjacent loop, while the passage s' at the lower end of the water-leg e' connects with the passage s'' at the lower end of the water-leg e of the next adjacent loop. When the faces of a and a' are brought together, the circulation between e and e' of the next adjacent loop is complete, and when the faces of s' and s'' are brought together the two form one continuous passage from e' to e of the next adjacent loop, and this forms a drainage-passage for the several loops, and the radiator is connected alternately with feed and drainage on the one side and drainage and feed on the other.

The top of the radiator-loop is provided with a transverse passage r , in circulation with the water-legs e and e' of the radiator-loop by means of vertical passages h and h' . The said transverse passage r is along the extreme top of the radiator-loop and runs at right angles with the water-legs e and e' . The radiator-loop is also provided with longitudinal passages r' and r'' , running at right angles with the transverse passage r , which said passages r' and r'' are provided at one end thereof with male couplings y and y' , which are adapted to fit into female couplings z and z' at the other ends of the said passages r' and r'' of the next adjacent loop. The said passages r' and r'' by means of the transverse passage r are in circulation with each other, and by means of the vertical passages h and h' are in circulation with the water-legs e and e' . The female couplings z and z' are each adapted to receive a compressible ring or

gasket to prevent leakage. The said passages h and h' are vertical with the water-legs e and e' and at right angles with the transverse passage r and the longitudinal passages r' and r'' , and by means of the said vertical passages h and h' the transverse passage r and the longitudinal passages r' and r'' are placed in circulation with the water-legs e and e' , and by means of the said passages the stagnant air may be drawn off the entire radiator by an automatic valve placed on one of the end loops of the radiator. This radiator-loop may be made without the transverse passage r and the radiator will be properly ventilated by means of the vertical passages h and h' and the longitudinal passages r' and r'' .

In practice when the loops are placed together the male connections p of the hub t are inserted into the female connections p' of the hub t' of the next adjacent loop, a compressible ring or gasket being interposed between the male and female connections, and the male connections m of the hub n are inserted into the female connections m' of the hub n' of the next adjacent loop, a compressible ring or gasket being interposed between the male and female connections. These two connections are at the bottom of the radiator-loop. The male connections y and y' of the hubs k and k' are inserted into the female connections z and z' of the hubs l and l' of the next adjacent loop, compressible rings or gaskets being interposed between the male and female connections. The hubs k and k' and l and l' are at the top of the radiator-loop. The coupling-nut or other coupling medium is then tightened and the adjoining loops forcibly brought together, causing the male connections to force the compressible rings into the female connections, thus preventing any leakage from any of the said openings.

The end loop of the radiator may be provided with an automatic valve for venting purposes.

The circulation of the water or steam is as follows: The water enters the loop O at the port a , passes through the right-angle bend at the bottom of the water-leg e , up the water-leg e around d into the water-leg e' , down the water-leg e' to the right-angle bend at the bottom or end thereof, out through the port a' into the port a of the next adjacent loop, and so on to the end loop of the radiator, when it discharges into the return-pipe.

When the radiator is used in a horizontal position, or lying flat, the ports a and a' will alternately be on the upper side of the radiator, and through the tubular passages s , s' , and s'' the water caused by the condensation of steam or otherwise will pass from one loop into the other and through said ports to the flow or return pipe, according as the radiator is used on a one or two pipe system, and by means of the said passages s , s' , and s'' and the ports a and a' the radiator can be entirely emptied of water when not in use.

The fact of being able to drain from the lowest point and on either side of the loop causes this radiator to be used to advantage in either a vertical or horizontal position and enables the condensation to be drained off the radiator in either position.

The vertical passages h and h' being in circulation with the water-legs e and e' and also in circulation with the longitudinal passages r' and r'' the stagnant air may be drawn off the water-legs e and e' at the highest point, and by this means prevent cushioning in the upper part of the loops, and thereby assist in a free circulation of steam or water.

The hubs t and t' of the end loops of the radiator instead of being fitted with male and female connections are fitted to receive the flow or exhaust pipe, and the hubs n and n' of the outer side of the end loops of the radiator are entirely removed, as the condensed steam passes in the end loop of the radiator to the flow or return pipe without the assistance of the drainage-openings.

Having now particularly described and ascertained the nature of our said invention, we hereby declare that what we claim is—

1. A radiator having loops coil-shaped the water-legs thereof being in circulation at the top only, said loops having a transverse passage at the top of the loop and two passages vertical to the said water-legs and connected with the transverse passage at the top of the loop, one of said vertical passages being located at one side of the loops and the other at the other side thereof, substantially as set forth.

2. A radiator having loops coil-shaped the water-legs thereof being in circulation at the top only, having a transverse passage, and two vertical passages, and two longitudinal passages at the two upper angles of the radiator-loops at opposite sides thereof, and at right angles to the vertical and transverse passages and the water-legs, whereby when the several loops of the radiator are brought together the two longitudinal passages form two

continuous parallel passages from one end of the radiator to the other in circulation with the water-legs of the several loops thereof by means of the transverse and vertical passages therein, substantially as set forth.

3. The combination with the legs of the radiator-loop provided with transverse passages at their lower ends, of a brace connecting the legs and provided with a passage, substantially as set forth.

4. A coil-shaped radiator-loop having right-angle bends or elbows at the lower or feed and return ends of the water-legs with openings or passages joining with the right-angle bends at the opposite side of the said elbows from the outlet and inlet ports, said openings or passages when two loops are brought together registering to form one continuous passage between the loops for drainage purposes substantially as set forth.

5. A radiator-loop provided with vertical air-passages arranged at opposite sides of the upper end of the loop; a longitudinal passage communicating with and connecting said vertical passages, transverse air-passages arranged at right angles to the longitudinal passage and communicating with the latter; and transverse and horizontal drainage-passages at the lower end of the loop and communicating with the water-legs of said loop, substantially as shown and described.

6. A radiator comprising a plurality of loops each of which is provided at opposite sides of its upper end with two independent passages communicating with the water-legs of the loop; and at opposite sides of its lower end with two independent drainage-passages also in communication with the water-legs, substantially as shown and described.

Dated the 3d day of April, A. D. 1897.

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Witnesses:

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