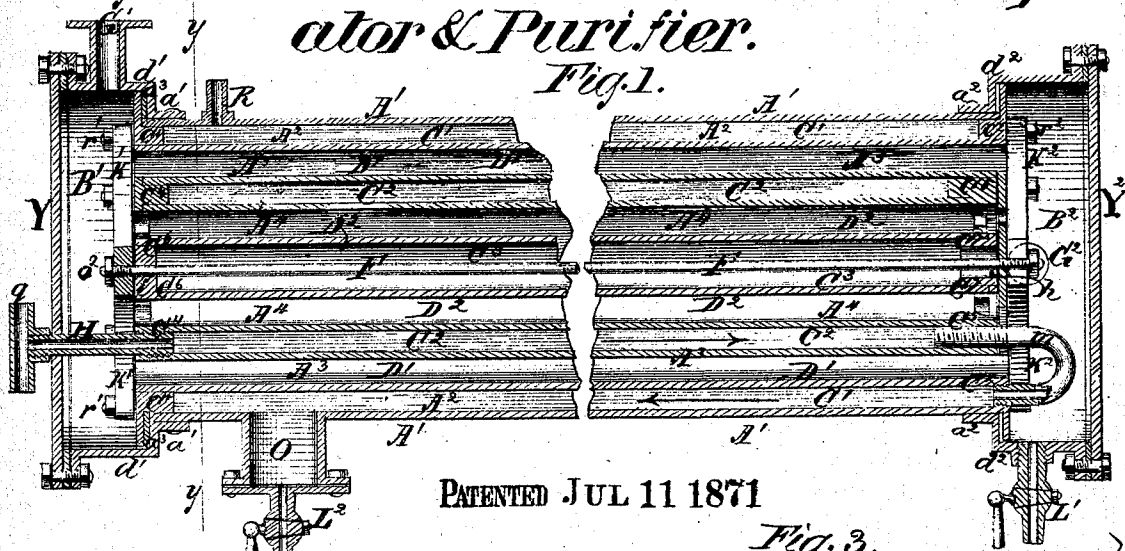


J. Argalls. Steam Water Heater Attenuator & Purifier.

Fig. 1.



PATENTED JUL 11 1871

Fig. 3.

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Fig. 2.

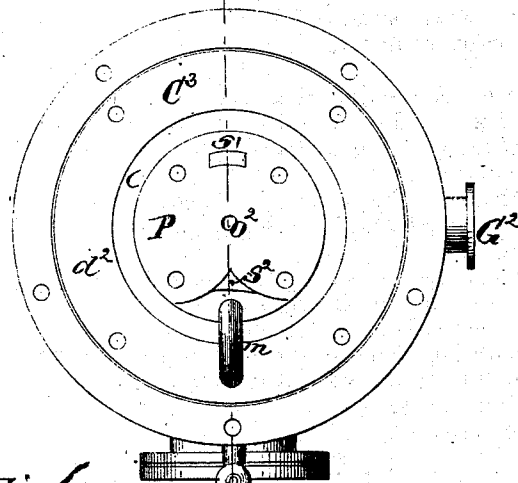
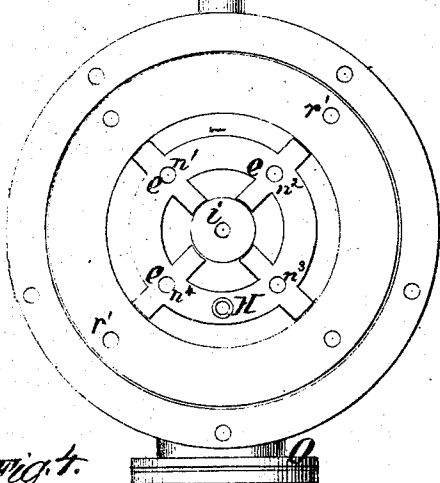


Fig. 4.

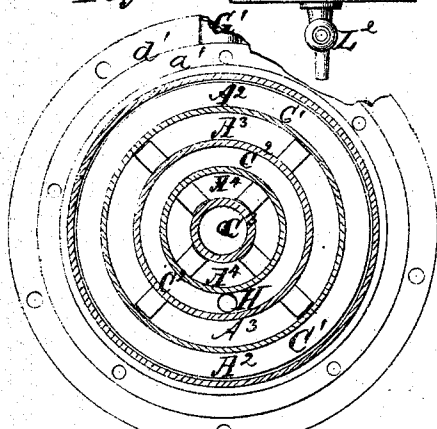


Fig. 6.

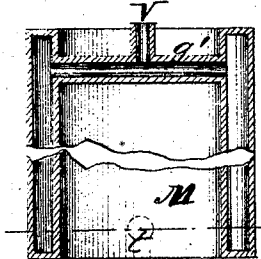


Fig. 5.

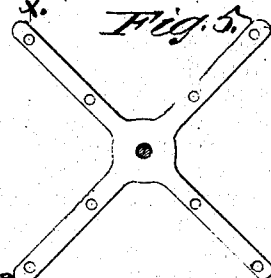
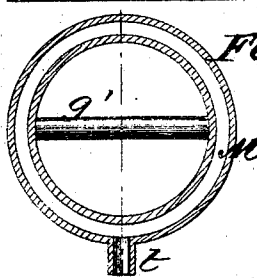


Fig. 7.



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JAMES ARGALL, OF MINERAL POINT, WISCONSIN.

IMPROVEMENT IN STEAM WATER-HEATERS.

Specification forming part of Letters Patent No. 116,792, dated July 11, 1871.

To all whom it may concern:

Be it known that I, JAMES ARGALL, of the city of Mineral Point, in the county of Iowa and State of Wisconsin, have invented a new and Improved Steam Water-Heater, Attenuator, and Purifier, which I call and designate as "Argall's Steam Water-Heater, Attenuator, and Purifier;" and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, which consists of two parts, reference being had to the annexed drawing making a part of this specification.

Figure 1 is a longitudinal section on the line *xx* of Fig. 3. Fig. 2 is a front view with the plate removed. Fig. 3 is a rear view with cover removed. Fig. 4 is a sectional view on the line *yy* of Fig. 1. Fig. 5 is a detached view of the spider. Figs. 6 and 7 are sectional views of the attenuator.

The heater is constructed as follows: It consists of the outside shell or cylinder *A*¹, which is made either of boiler-iron, cast-iron, or other suitable material. The front end of this cylinder is inserted in and encompassed by the flange *a*¹ of the cylindrical steam-box *B*¹, and firmly riveted thereto. The rear end of cylinder *A*¹ is similarly inserted in and encompassed by and riveted to flange *a*² of the cylindrical steam-box *B*², which said steam-box is the counterpart of steam-box *B*¹. When made of cast-iron these said several parts are cast as in one piece. Inside of cylinder *A*¹ is cylinder *A*², which is constructed of the same material and is of the same length, but two inches less in diameter. The front of said cylinder *A*² is fitted within the base of the angular ring *c*, which said base is furnished with a shoulder, wherein said cylinder rests and to which it is firmly riveted by attaching cylinder *A*² to the base of ring *c*¹. In this manner the perpendicular of said ring is projected outward in a horizontal manner, thus forming flange *a*³. The rear end of cylinder *A*² is inserted in and encompassed by the ring *c*², having also a shoulder, in which the end of the cylinder rests and to which it is firmly riveted. This cylinder works in cylinder *A*¹ in a telescopic manner, and when ready for use the flange *a*³ overlaps and rests on the base or shoulder *d*¹ of the steam-box *B*¹, and bringing thereby the rear end of cylinder *A*² on a level with the shoulder or base *d*² of box *B*², and

over which is placed a rubber gasket, secured by the ring *c*³, rendering the same water-tight and forming the cylindrical water-chamber *C*¹. The water-chamber *C*² is formed by conjoining cylinders *A*³ *A*⁴, cylinder *A*³ being four inches and cylinder *A*⁴ six inches less in diameter than cylinder *A*¹, but of the same length. Cylinders *A*³ *A*⁴ are joined at their ends by the rings *c*⁴ *c*⁵, which said rings are provided with the cam-like projections *e*, whose office and purpose are to keep separate and equidistant the cylindrical water-chamber *C*² from the cylindrical water-chamber *C*¹ and from the central cylinder *C*³, thus forming the steam-chambers *D*¹ *D*². The under side of the cammed rings *c*⁴ *c*⁵ is of a T-shape, in the shoulders of which rest the cylinders *A*³ *A*⁴, and secured thereto by riveting; or they can be conjoined and secured in the same manner as cylinders *A*¹ *A*², thereby enabling of their being readily taken apart and cleaned. The central cylinder *C*³ consists of a single cylinder, sunk in and riveted to the stay-rings *c*⁶ *c*⁷. The front end of the cylinder is covered with the circular cap *i*, the rear end being open, as seen by *h*. Other cylindrical chambers, constructed in the manner as hereinbefore described, can be substituted in lieu of cylinder *C*³, if thought necessary. These several cylinders, sliding, the one into the other, in a telescopic manner, are secured fast in position on the front side by means of the spider *K*¹ and the bolt *F*, which extends throughout the length of the cylinders and through the center of the spider *K*¹, where it is secured by the nut *o*. Spider *K* is further secured by the stud-bolts *n*¹ *n*² *n*³ *n*⁴, which screw in the center of the cams *e* of rings *c*⁴ *c*⁵, and also by the bolts *r*; on the rear side they are secured by the circular cap *P*, which cap extends to the outer edge of cylinder *A*³, thereby covering the steam-passage *D*². Over this is placed the spider *K*², fastened in the same manner as spider *K*¹, the bolt *F* passing through the center and secured by the nut *o*². Cap *P* has two apertures, *s*¹ *s*², to admit of the escape of the steam entering into the steam-passage *D*². The object of stopping up the said passage and retarding and forcing the steam through said apertures is to more thoroughly economize and utilize its caloric. The cylindrical steam-boxes *B*¹ *B*² are covered by the circular plates *F*¹ *F*², which are securely bolted thereto and rendered perfectly tight by rubber gaskets.

Into steam-box B¹ opens the receiving-pipe G¹; through its cover I' also passes the water-pipe H, which extends through the said steam-box and screws and opens into the water-chamber C². The box B² is furnished at its lower end with the stop-cock L¹ for the escape of condensed water, and at the side with the steam-escape pipe G², being the counterpart of pipe G¹. The water-chambers C¹ C² are connected by means of the return-pipe *m*, which screws into the same by a right-and-left screw-thread. At the lower front end of cylinder A¹ is attached and firmly riveted the circular reservoir on deposit-box O. The mouth of reservoir O is covered by a circular plate, being either of a flat or conical shape, and centering in the stop-cock L². To cylinder A¹ is also attached, at its upper front end, the pipe R, leading into the boiler and connecting the water-chambers of the heater with the boiler.

The attemperor M consists of the cylindrical steam-chamber, which is constructed in the same manner as water-chamber C² of the heater, its size and dimensions being dependent on the sized tank in which it is intended to be used. At its upper end, and crossing it transversely, is distributing-pipe *g'*, in the center of which is the receiving-pipe *v*, which connects with the exhaust-steam pipe G² of the heater. At the lower part, if necessary, is another pipe, the counterpart of pipe *g'*, and also the escape-pipe *t*, which faces toward the outside.

The manner in which my machine is operated is as follows: The heater is attached to the engine so that the exhaust steam therefrom passes into the receiving-pipe G, by which it is conducted into steam-box B¹, which same it fills instantaneously, and whence it passes, through the steam-chambers D¹ D², into the exhaust-steam box B², from where it escapes either through

stop-cock L¹ as condensed water or through escape-pipe G². The water-pipe H being connected with the pump, the water is forced through it into the water-chambers C², from where it passes into the water-chamber C¹ through the return-pipe *m*. As a consequence, after the water in chamber C¹ has risen to a level with chamber C², both will equally fill together until water-chamber C¹ is full, the water-course being indicated by the straight arrows. After water-chamber C¹ is full, the water, which is now boiling, is forced through pipe R into the boiler, as will be seen.

My heater consists of a series of concentric cylinders, the one inclosing the other in such a manner as to leave an inch space, (more or less, as is advisable or thought necessary,) forming thereby the alternate cylindrical water and steam-chambers C¹ C² and D¹ D². The attemperor is placed in the water-tank so that the escape-pipe *t*, which may be furnished with a safety-valve, projects through on the outside. The receiving-pipe *v* is then connected with the exhaust-pipe G² of the heater, through which the exhaust steam from the heater passes into the distributing-pipe *g'*, and from there is conducted into the cylindrical steam-chamber M, which same it instantaneously fills, and after expending its caloric escapes through pipe *t* as condensed water or very exhaust steam.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

A steam water-heater, consisting of a series of concentric cylinders, with the parts connected therewith, constructed and arranged substantially as and for the purposes herein shown and described.

Witnesses:

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