

No. 641,179.

Patented Jan. 9, 1900.

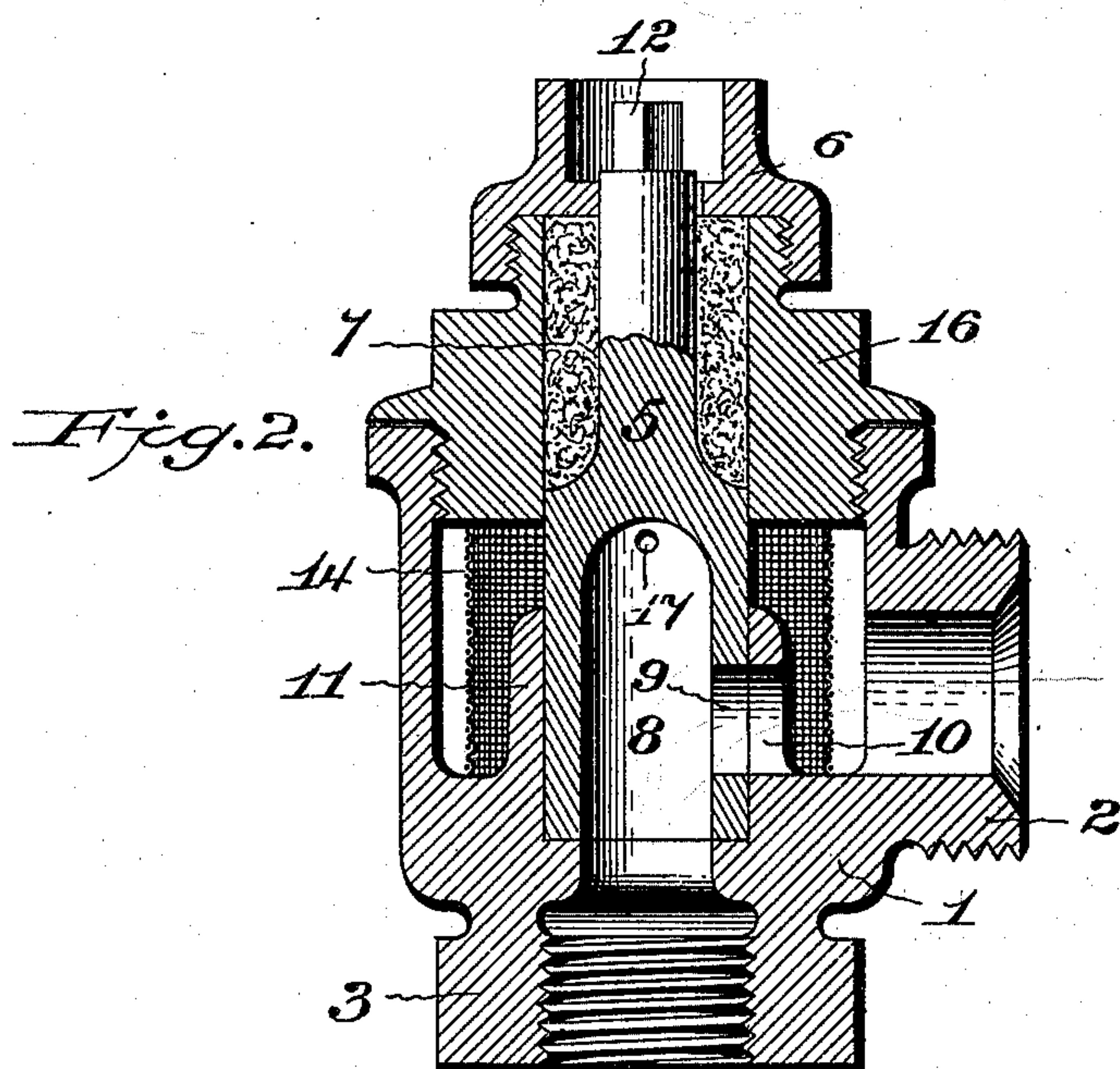
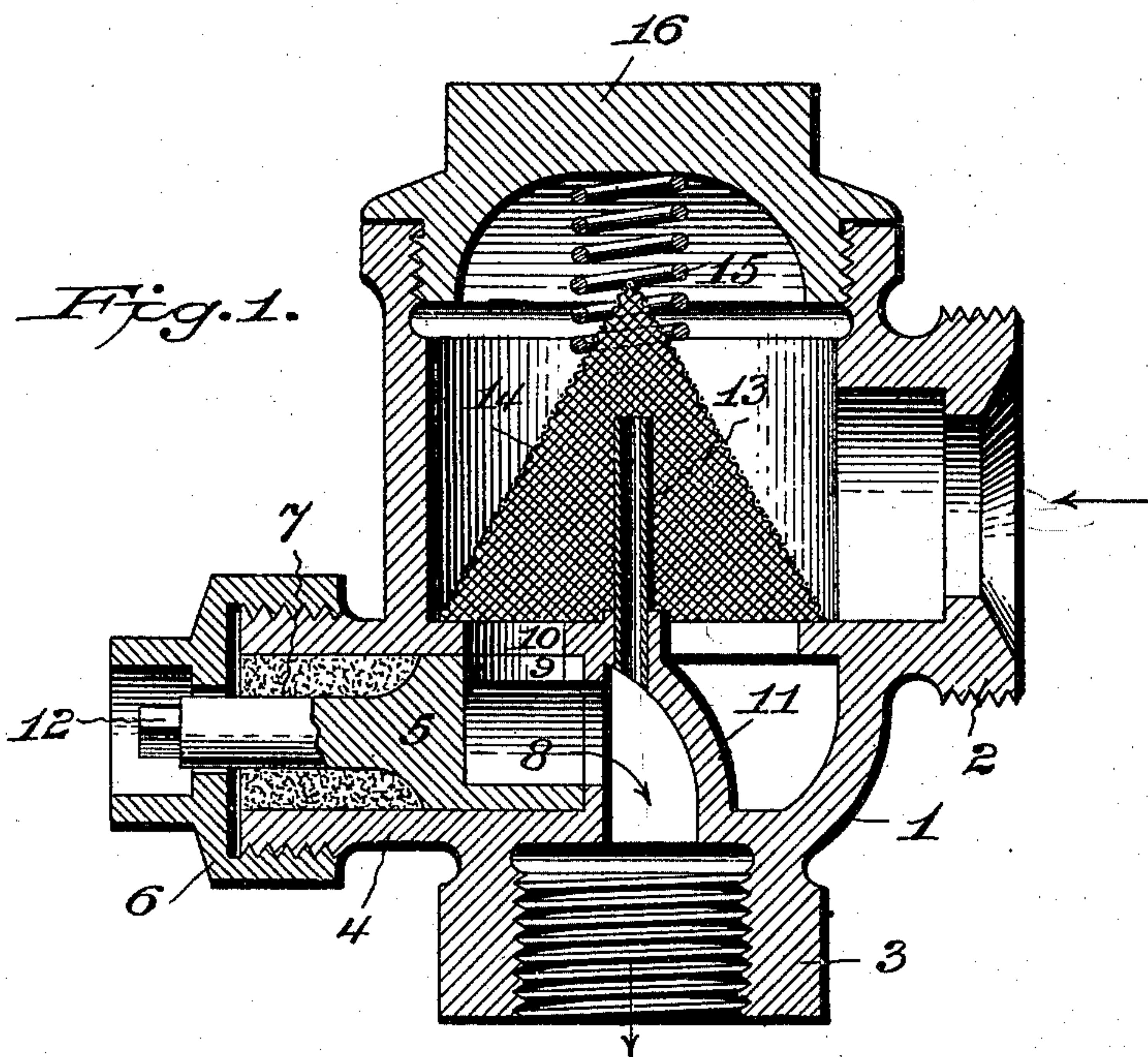
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FITTING FOR STEAM HEATING SYSTEMS.

(Application filed Mar. 17, 1899.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses
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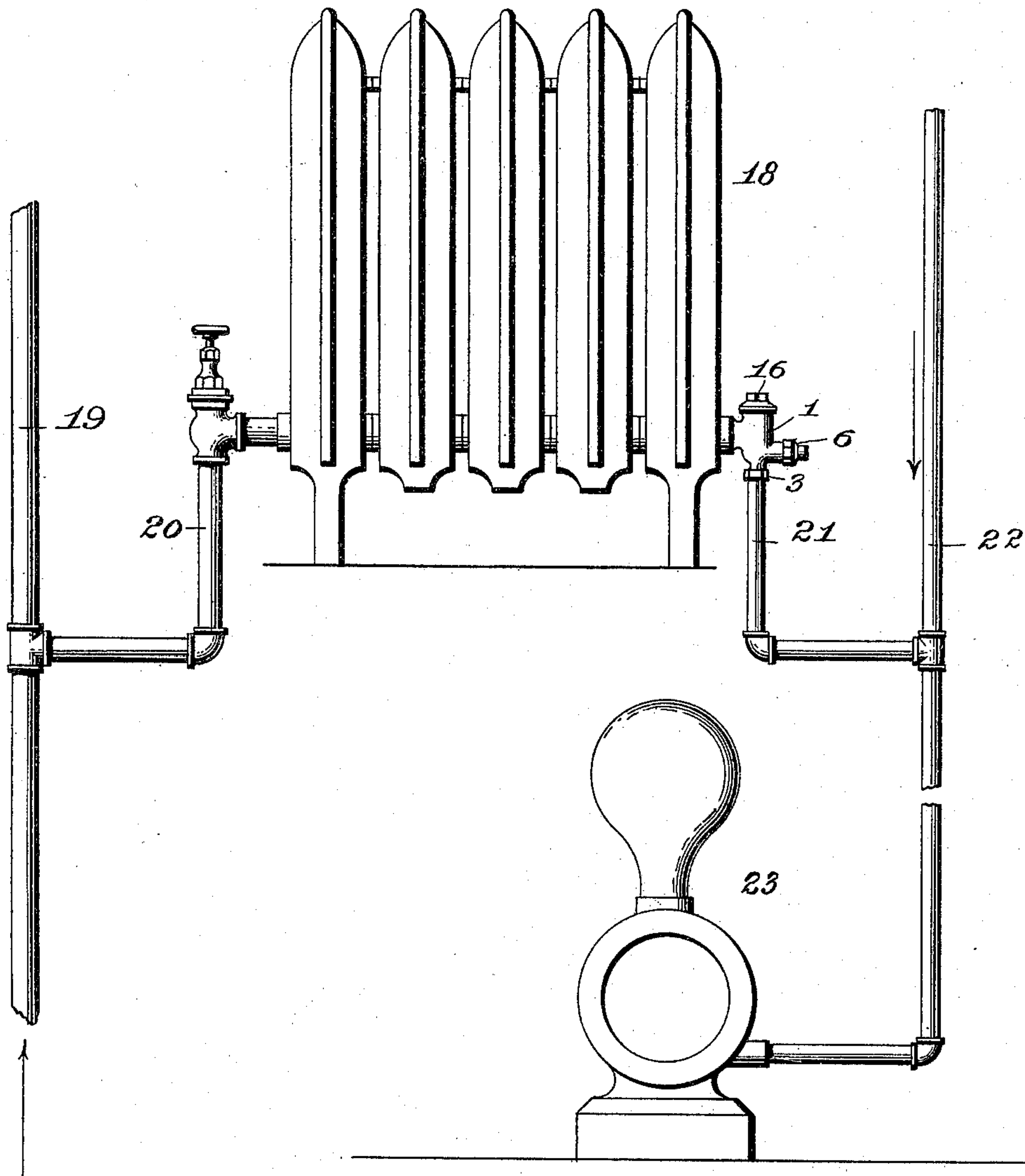
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2 Sheets—Sheet 2.

Fig. 3.



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UNITED STATES PATENT OFFICE.

CHARLES A. BALL, OF WASHINGTON, DISTRICT OF COLUMBIA.

FITTING FOR STEAM-HEATING SYSTEMS.

SPECIFICATION forming part of Letters Patent No. 641,179, dated January 9, 1900.

Application filed March 17, 1899. Serial No. 709,498. (No model.)

To all whom it may concern:

Be it known that I, CHARLES A. BALL, a citizen of the United States, residing in Washington, in the District of Columbia, have invented certain new and useful Improvements in Fittings for Steam-Heating Systems, of which the following is a specification.

My invention relates to fittings for the return side of radiators, steam-coils, and other similar articles, and is more particularly designed for use in steam-heating systems where in a circulation is created and maintained by means of an exhaust apparatus, such as a vacuum-pump, operating through the return-pipe of the system.

It has long been recognized that considerable air is carried along continuously and mechanically by the steam in heating systems, the same being estimated to be equal to about five per centum of the volume of the water evaporated, and it is the object of my improved construction to provide a static fitting in the exhaust that will permit a continuous escape for this air and for the water of condensation in the radiator and yet will prevent the escape of steam. By the term "static" as applied to my improved fitting I wish to be understood as meaning a fitting that when once adjusted to the requirements of its particular system requires no further manipulation and remains fixed as to all its parts in contradistinction to the well-known thermostatic valves heretofore employed on steam-heating radiators in which the parts are moved by the variations of temperature to open or close the valves. This object I accomplish in the manner and by the means hereinafter described and claimed, reference being had to the accompanying drawings, in which—

Figure 1 is a vertical longitudinal sectional view of a fitting embodying my improved construction. Fig. 2 is a similar view illustrating a somewhat modified construction. Fig. 3 is a view illustrating a portion of a steam-heating system in which my improved fitting is shown applied to the base of the radiator.

In the said drawings, referring more particularly to Fig. 1, the reference-numeral 1 denotes a casing apertured and exteriorly screw-threaded on one side at 2 for attachment to the base of the radiator and also ap-

ertured and interiorly screw-threaded on its under side at 3 for attachment to the exhausting-pipe of the system. On the side opposite to part 2 the casing is formed into an exteriorly-screw-threaded projection 4, the same extending into the casing and forming a seat for a plug-valve 5, as shown. Said plug-valve is retained in position by nut 6 and packing 7 and is formed hollow at its inner end at 8 and provided with a circular side port 9, adapted to register with a similar port 10 in a partition-wall 11, separating the inlet-aperture of the casing from its exit-aperture. Said plug-valve is squared at its outer projecting end 12 for the reception of a suitable key for manipulating the same.

Tapped through the partition-wall 11 of the casing is a short pipe 13, open at both ends, said pipe extending vertically for some distance into the upper chamber or casing 1. A wire screen 14, of conical shape, is provided in said casing to prevent dirt or sediment from passing into the casing, said screen being retained in position by a spring 15, abutting against bonnet-piece 16, screw-threaded into the upper end of casing 1.

I have shown in Fig. 3 my improved fitting applied to a radiator, the latter being shown at 18, and connected at its opposite end to the supply-pipe 19 through branch 20, the said fitting being interposed in branch 21 of the return or exhaust pipe 22, which is in turn connected at its lower end to any suitable exhausting apparatus, such as a vacuum-pump 23.

The operation of my improved construction is as follows: When first operating the system, the plug-valve 5 is turned to close the ports 9 and 10, and the action of the exhaust apparatus or vacuum-pump 23 in the engine-room will extract the cold air from the system through pipe 13, branch 21, and return-pipe 22, thus inducing a circulation of steam in the radiator from supply-pipe 19 with consequent condensation. The ports 9 and 10 may then be adjusted with respect to each other by manipulating plug-valve 5 until the relief for the water of condensation therethrough will be only sufficient under a normal speed of the vacuum-pump to carry off said water and yet at the same time to leave said ports submerged. Experience has demonstrated

that not only does the water fall to the bottom of the radiator, but also the entrained air due to the difference between its specific gravity and that of steam, and I provide for its escape into the exhaust-pipe through pipe 13, the upper end of which terminates some distance above ports 9 and 10, as shown. Now as the quantity of both the water and the air varies conditionally with differences of temperature it is necessary to provide for this variation without further adjustment of the plug-valve 5, and this I accomplish by accelerating or retarding the speed of the vacuum-pump 23 in the engine-room, thus placing the whole system under the control of the engineer without the necessity for his leaving the engine-room. I also prefer to form the pipe 13 of a ductile metal, such as soft brass, whereby its capacity may be varied in the first instance to suit the requirements of the situation by removing bonnet-piece 16 and squeezing or compressing said pipe between the fingers to alter or vary its cross-area. It will be understood that if after the adjustment of the ports as described the system be permitted to again fill with air, due to cessation of firing for any considerable time, when steam is again admitted it is obvious that both the water and the air ports will relieve air until condensation begins, whereupon the water-port alone will relieve the water, no further adjustment of plug-valve 5 being necessary, its proper capacity having once been established under normal conditions.

I have shown in Fig. 2 a slightly-modified construction wherein the plug-valve 5 is placed vertically in the casing 1 instead of horizontally, as in Fig. 1, this change being effected by locating its retaining-nut 6 on bonnet-piece 16 and forming the gland for the packing 7 in said bonnet-piece, as shown. In this construction the air-pipe 13 is dispensed with, its function being performed by a port 17 in the upper part of the apertured portion of plug-valve 5.

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

1. In a steam-heating system, the combination with a radiator, a supply-pipe thereto, an exhaust-pipe therefrom, and a vacuum apparatus connected to said exhaust-pipe, of a fitting having communication with the radiator and the exhaust-pipe and provided with a water-of-condensation outlet and an air-outlet conduit extending above the water-of-condensation level.

2. In a steam-heating system, the combination with a radiator, a supply-pipe thereto, an exhaust-pipe therefrom, and a vacuum apparatus connected to said exhaust-pipe, of a fitting having communication with the radiator and the exhaust-pipe and provided with an adjustable water-of-condensation outlet and an air-outlet conduit extending above the water-of-condensation level.

3. An exhaust-fitting for the radiators of steam-heating systems, consisting of a casing, a valve in said casing having an adjustable port for the escape of water of condensation from the lower part of said casing, and a port for the escape of air opening from above the water-of-condensation level.

4. An exhaust-fitting for the radiators of steam-heating systems, consisting of a casing, a rotatable chambered plug-valve therein having a port adapted to register with a similar port in said casing the two constituting a water-of-condensation outlet, and a conduit opening into the exhaust and extending up and terminating above the water-of-condensation level.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

CHARLES A. BALL.

Witnesses:

ADAM R. SLOAN,
WM. J. PAUL.