

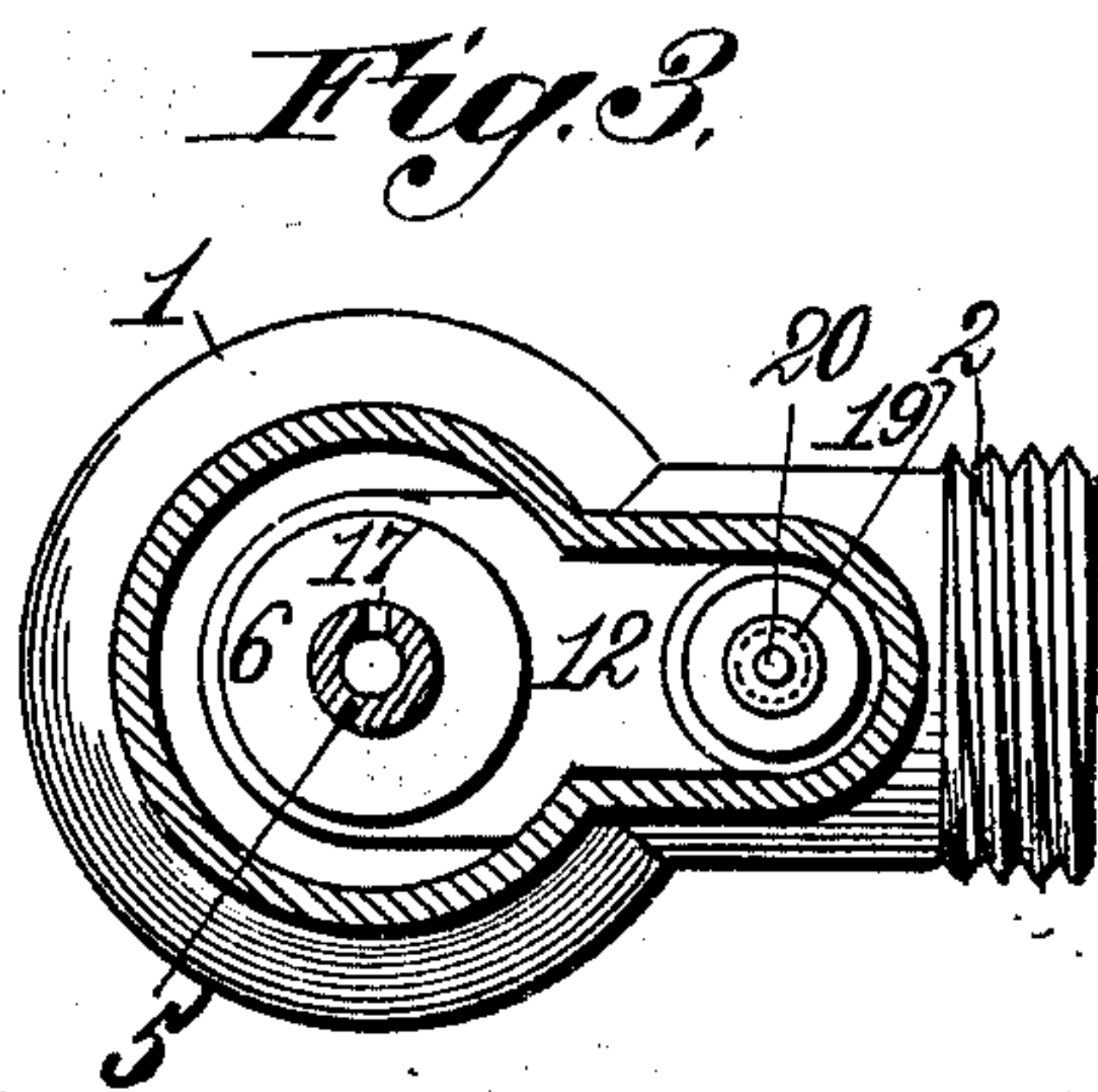
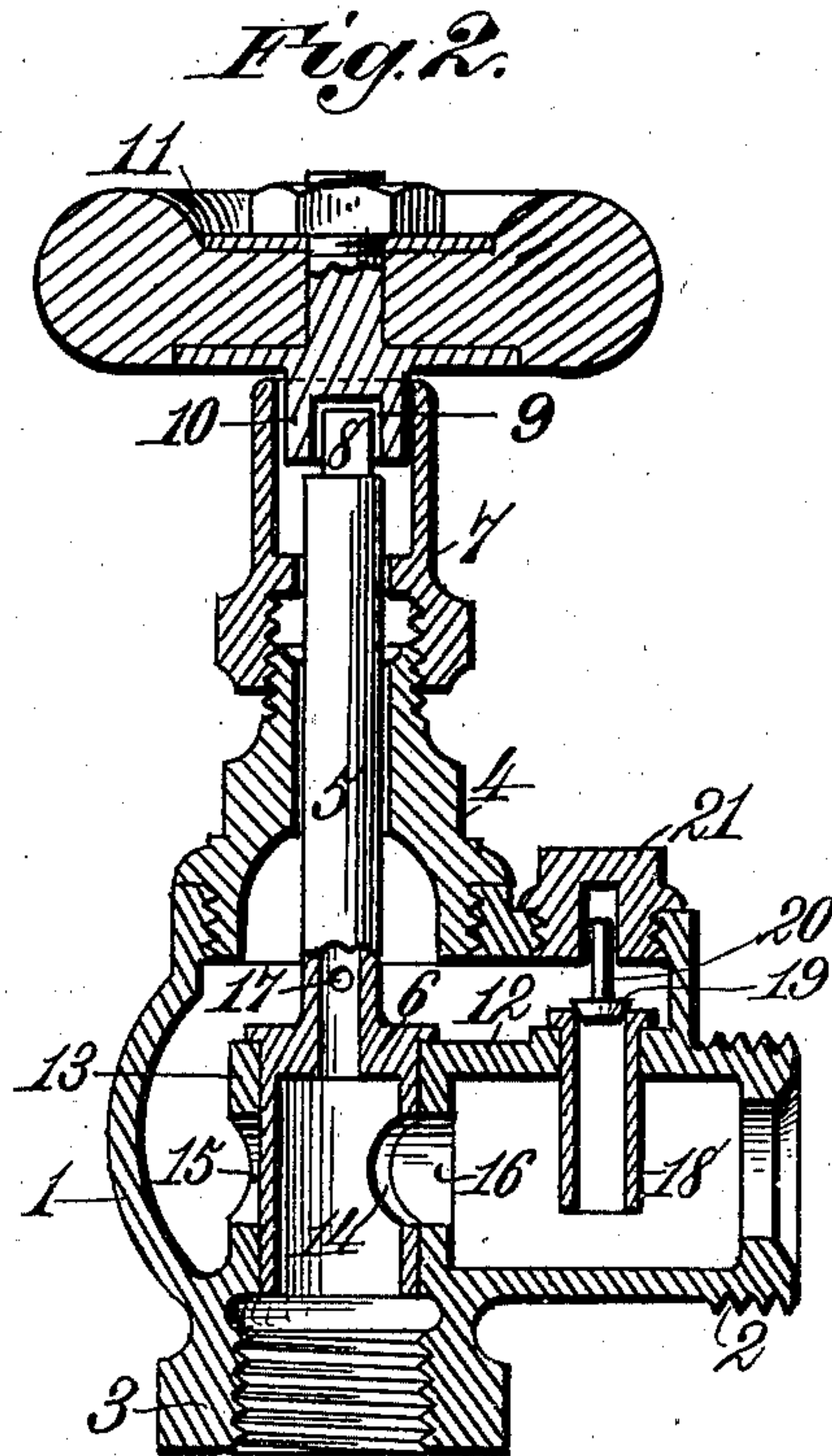
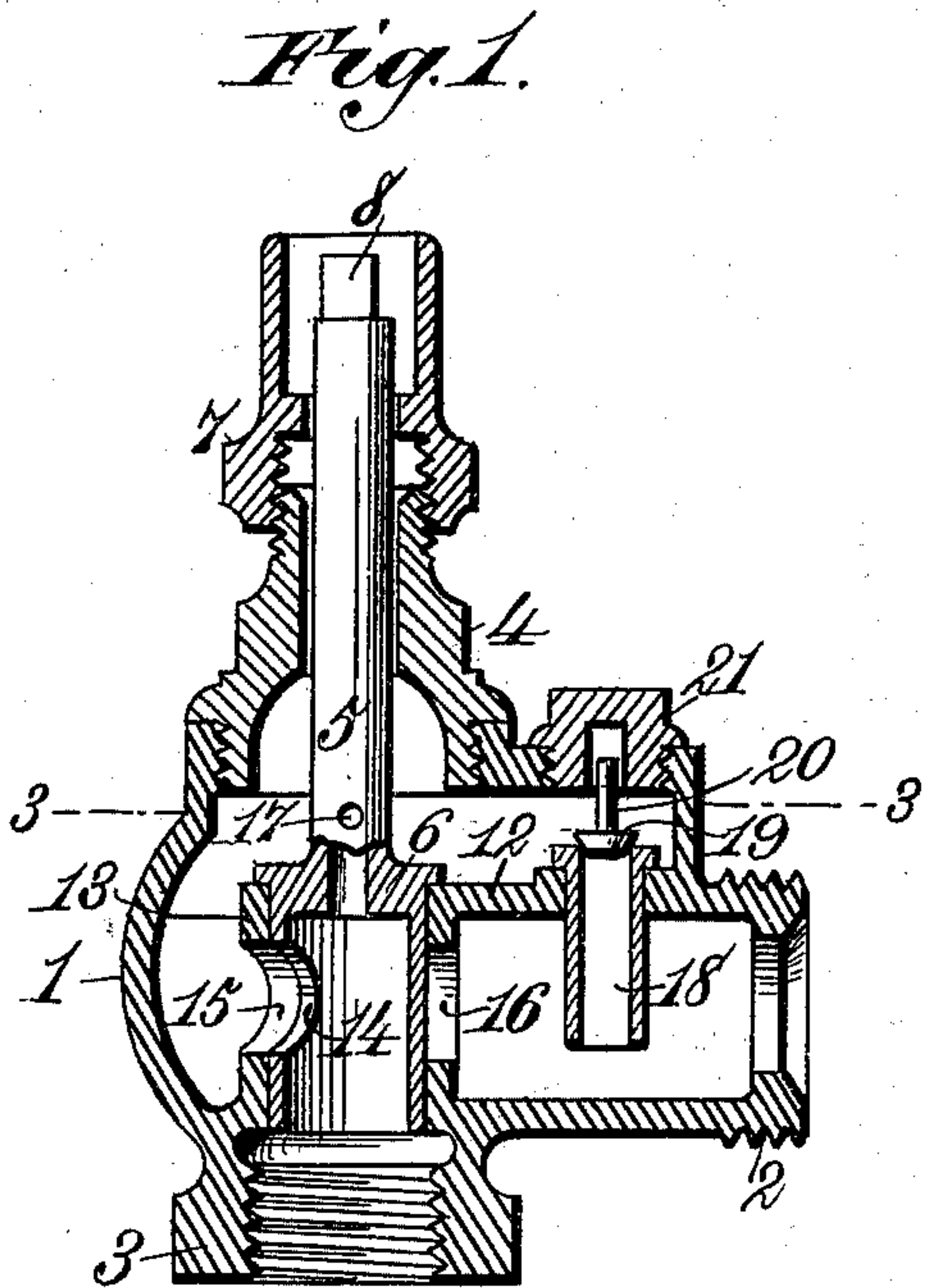
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C. A. BALL.
FITTING FOR STEAM HEATING SYSTEMS.

(Application filed Mar. 6, 1902.)

(No Model.)



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UNITED STATES PATENT OFFICE.

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FITTING FOR STEAM-HEATING SYSTEMS.

SPECIFICATION forming part of Letters Patent No. 702,336, dated June 10, 1902.

Application filed March 6, 1902. Serial No. 96,987. (No model.)

To all whom it may concern:

Be it known that I, CHARLES A. BALL, a citizen of the United States, residing at Washington, in the District of Columbia, have invented 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 equally well adapted for use in steam-heating systems wherein exhaust-steam is employed and a circulation is created and maintained by means of an exhaust apparatus, such as a vacuum-pump operating through the return-piping of the system, or wherein live steam is employed and the circulation created and maintained through the expansive energy of the steam itself.

My invention is particularly designed to provide a fitting that when once adjusted to the requirements of its particular radiator will require no further adjustment under either an exhaust or a live steam supply and which may at the same time be instantly converted by an unskilled operator into a clean-out fitting for sediment, dirt, &c., and then be restored to its normal operative position.

Certain other novel features are embodied in my improved construction, as will be hereinafter more definitely pointed out and claimed, reference being had to the accompanying drawings, in which—

Figure 1 is a central vertical view of my improved valve shown in operative position for exhausting the entrained air and water of condensation. Fig. 2 is a similar view showing the parts in position to permit a free clean-out passage therethrough from the radiator to the return-pipe. Fig. 3 is a horizontal sectional view taken on the line 33, Fig. 1.

Similar numerals of reference denote corresponding parts in the several views.

In the said drawings 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 apertured and interiorly screw-threaded on its under side at 3 for attachment to the return or exhausting pipe of the system.

Screwed into the upper end of the casing 1 is a bonnet-piece 4, through which passes the

stem 5 of a plug-valve 6, hereinafter described, the same terminating in the open end of a conventional packing-nut 7, screwed onto the bonnet-piece 4, the extreme upper end 8 of said plug-valve stem being irregularly shaped to engage a similar irregular aperture 9 in the stem 10 of an ordinary removable hand-wheel 11, as shown.

The casing 1 is provided on its interior with a partition 12, dividing the casing into two chambers, said partition being formed into a vertical cylindrical extension 13, receiving the plug-valve 6, and in which the latter is adapted to be freely rotated. Said plug-valve is hollow and open at its lower end to communicate freely with the exhaust-pipe of the system and is also provided on one side with an aperture 14, preferably of even diameter with the two apertures 15 and 16, formed in the extension 13 of the partition 12 and on opposite sides thereof, as shown, the said aperture 14 being adapted to register accurately with either of the apertures 15 16 or to be out of register with both, as desired. The stem 5 of the plug-valve is formed hollow for a short distance above its point of juncture with said valve and is provided with a small aperture 17, communicating with the interior of said valve.

Mounted in the partition 12 on the radiator side of the valve 6 is a vertical pipe 18, the same communicating with both sides of said partition and projecting downwardly into the chamber on the radiator side to within a short distance of the bottom thereof, as shown. Seated in the upper end of said pipe is a check-valve 19, the same being provided with a guide-stem 20, projecting upward into the nut 21, as shown.

From the above description the operation of my improved construction will be understood to be as follows: It is desirable when a system is first installed to subject the same to a thorough washing out in order to remove as far as possible all dirt and sediment contained therein and this I accomplish by turning the plug-valve to the position shown in Fig. 2 and then admitting steam under considerable pressure to the system, the result being that as there is a free passage through apertures 16 and 14 from the radiator to the return-pipe all dirt and sediment

will be promptly carried off through the return-pipe, and by connecting the latter with the sewer any clogging of the vacuum-pump and its ports is prevented. This cleaning-out process being accomplished, the plug-valve is turned to substantially the position shown in Fig. 1, thus closing aperture 16 and opening aperture 15, communicating with the interior of casing 1. Exhaust-steam being now admitted to the system and the usual vacuum-pump started on the return side thereof, a reduction of the air-pressure in casing 1 will promptly take place by reason of the extraction of the air therein through apertures 15 and 17, which reduction in pressure will be communicated to the radiator through pipe 18, the check-valve 19 opening freely upwardly to permit the passage of the air therethrough. The necessary vacuum being thus provided in the radiator, the exhaust-steam will fill the same and condensation therein will ensue, as usual. The extraction of entrained air will now continue through pipe 18 and apertures 17 and 15, and the water of condensation from the radiator will accumulate in the casing 1 beneath the lower end of pipe 18 until it submerges the same, whereupon it will be lifted by the suction through said pipe and past the check-valve 19 and will then escape into the return-pipe of the system through apertures 15 and 14.

It is well understood in vacuum systems that between the pump or exhausting apparatus where the vacuum is initial and greatest and the most remote radiator of the system considerable vacuum is lost through friction and leakage and that therefore radiators located at different distances from the exhausting apparatus will require a greater or less relief, according to their distance from the exhausting apparatus. The necessary relief for each radiator can be accurately obtained by adjusting its plug-valve 6 so as to graduate the port formed by the openings 14 and 15, and this adjustment may be accurately determined by the sound to an experienced operator of the draft of condensation and air through the valve, it being understood that when this adjustment is once obtained the upper end 8 of the valve-stem 5 and the edge of the packing-nut 7 may be nicked or marked in any suitable manner to indicate the same for future readjustment. In this way any unskilled person may periodically turn the valve 6 to the position shown in Fig. 2 to clean out the fitting and then accurately readjust the same to its proper vacuum position.

In order that there may be no water of condensation in the radiator, the casing 1 is so located with respect thereto that the lower end of pipe 18 therein shall be lower than the base of the radiator, and even with this arrangement while any sediment or dirt in the radiator will naturally gravitate toward the casing 1 and take position therein beneath

the pipe 18 the latter by relieving the top stratum of water only will not disturb said sediment or dirt, which by reason of its weight will remain at the bottom. Moreover, should such an accumulation of sediment take place as to choke the lower end of pipe 18, which will be evidenced by the casing becoming cold, the same may be instantly flushed out into the return-pipe by momentarily rotating valve 6 to the position shown in Fig. 2, and thus exposing it to the full effect of the vacuum as well as to the flushing effect of the water of condensation thus relieved with greater velocity.

An important function performed by the check-valve 19, located as shown, is as follows: When a radiator filled with steam is cut out of circulation by closing its inlet steam-valve, the condensation of the steam in said radiator produces for the time being a much stronger vacuum than that produced in the relief-piping by the exhausting apparatus, in which event a back draft of water from the other radiators and the return-piping into said radiator is almost certain to occur, thus causing a violent "hammering" when steam is again admitted to said radiator. In my improved construction, however, the check-valve 19 under this condition will immediately seat, and thus effectually prevent this objectionable feature. This excessive vacuum, due to this condensation in the radiator, is of short duration, however, due to its being supplied by leaks and structural defects in the radiator itself and when fully supplied and when the vacuum caused by the exhausting apparatus again becomes the stronger the check-valve 19 will lift and the air in the radiator be extracted, thus preparing the radiator for the free admission of steam when the inlet-valve is again opened.

It will be understood that my improved valve is as well adapted for use with a live-steam or pressure system as with an exhaust-steam or vacuum system, for while in the latter instance the water of condensation will be sucked up through the pipe 18 in the former instance the water of condensation will be forced up through said pipe 18, due to the pressure exerted by the live steam in the supply side of the system. For this reason said fitting is peculiarly well adapted for use in connection with the steam-heating system disclosed in Letters Patent No. 644,961, granted to me March 6, 1900, wherein either live or exhaust steam is employed, and it will be understood that when my improved fitting is once adjusted for the proper relief, according to its location with respect to its steam-supply, no further adjustment will be necessary when the system is changed from a live-steam to an exhaust-steam system, or vice versa.

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

1. A fitting for steam-heating systems, consisting of a casing adapted to communicate

with the radiator and return sides of the system, and a valve in said casing for establishing either direct communication therethrough for cleaning or blowing out, or indirect communication for relief of entrained air and water of condensation.

2. A fitting for steam-heating systems, consisting of a casing adapted to communicate with the radiator and return sides of the system, and a valve in said casing for establishing either direct communication therethrough for cleaning or blowing out, or indirect and adjustable communication for relief of entrained air and water of condensation.

3. A fitting for steam-heating systems, consisting of a casing having an outlet, a partition therein dividing said casing into two chambers, one adapted to communicate with the radiator side of the system, means for affording relief of entrained air and water of condensation from the chamber on the radiator side to the other chamber, and a valve adapted to establish either direct communication between the chamber on the radiator side and the outlet or between the other chamber and the outlet.

4. A fitting for steam-heating systems, consisting of a casing having an outlet, a partition therein dividing said casing into two chambers, one adapted to communicate with the radiator side of the system, means for affording communication between said chambers, and a valve in said partition controllable from the exterior and adapted to establish either direct communication between the chamber on the radiator side and the outlet or between the other chamber and the outlet.

5. A fitting for steam-heating systems, consisting of a casing having an outlet and divided into two chambers, one adapted to communicate with the radiator side and the other normally with the outlet, and a substantially vertical pipe communicating between the two chambers for permitting the relief of entrained air and water of condensation from

the chamber on the radiator side to the other chamber in an upward direction only.

6. A fitting for steam-heating systems, consisting of a casing having an outlet, a partition therein dividing said casing into two chambers, one adapted to communicate with the radiator side of the system, said partition having ports opening from each chamber into the outlet, a valve for controllably opening either of said ports or closing both of them, and means for affording communication between said chambers.

7. A fitting for steam-heating systems, consisting of a casing having an outlet, a partition therein dividing said casing into two chambers, one adapted to communicate with the radiator side of the system, said partition having ports opening from each chamber into the outlet, a valve for controllably opening either of said ports or closing both of them, and a pipe communicating between the two chambers for permitting relief of entrained air and water of condensation from the chamber on the radiator side to the other chamber in an upward direction only.

8. A fitting for steam-heating systems, consisting of a casing having an outlet, a partition dividing said casing into two chambers, one adapted to communicate with the radiator side and the other normally with the outlet, a substantially vertical pipe communicating between said chambers and projecting at its lower end into the chamber on the radiator side to a point above the bottom of said chamber, and a check-valve in said pipe permitting passage therethrough from the radiator side to the outlet side only.

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

CHARLES A. BALL.

Witnesses:

MARY F. LYONS,
FRED H. WOMRATH.