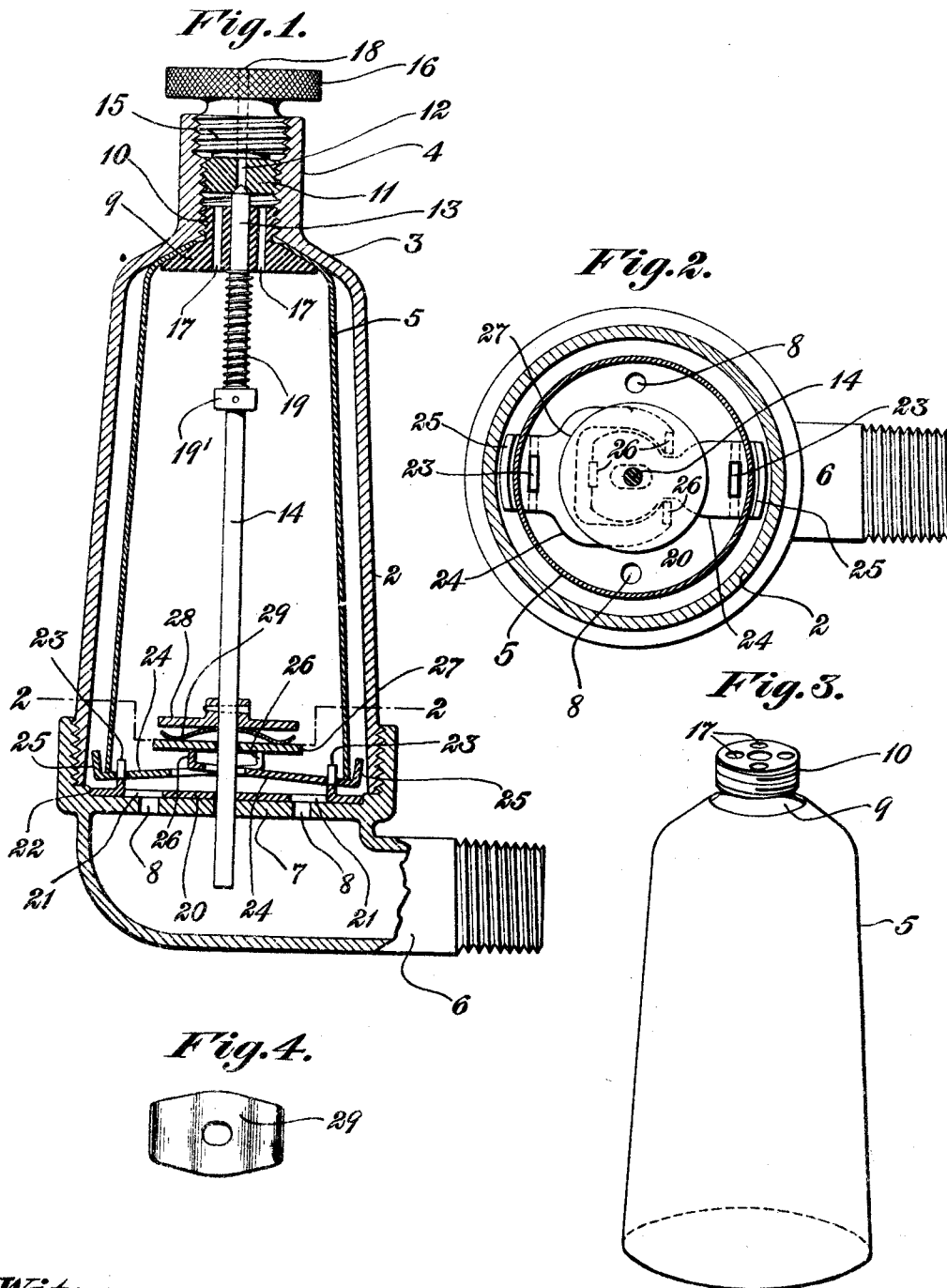


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AIR VALVE.
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1,109,174.

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UNITED STATES PATENT OFFICE.

CARL H. PETERSON, OF HARTFORD, CONNECTICUT.

AIR-VALVE.

1,109,174.

Specification of Letters Patent.

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To all whom it may concern.

Be it known that I, CARL H. PETERSON, a subject of the King of Sweden, residing at Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Air-Valves, of which the following is a specification.

This invention relates to what is known as an "air valve" or a structure which is associated with radiators forming part of heating systems and by which the cold air in the radiator can escape therefrom when necessary, but which shuts off the steam, among the principal objects of the invention being the provision of an article of this character which is simple in construction and positive and certain and wholly automatic in action. Said valve possesses other features of novelty and advantage which with the foregoing will be stated at length in the following description wherein I will set forth in full that one of the several forms of embodiment of the invention which I have selected for illustration in the drawings accompanying and forming part of the present specification. I do not limit myself to this disclosure; I may depart therefrom in several particulars within the scope of the invention defined by the claims following said description.

Referring to said drawings: Figure 1 is a vertical sectional view of an air valve involving my invention. Fig. 2 is a horizontal sectional view of the same on the line 2-2 of Fig. 1. Fig. 3 is a perspective view of an expansible and contractible member and a clamping member cooperative therewith, and, Fig. 4 is a detail view in plan of a spring.

Like characters refer to like parts throughout the several views.

The different parts of the device are inclosed in a suitable casing; that shown for the purpose being denoted in a general way by 2 and being tapered somewhat toward its top, the upper portion being reduced as at 3 and provided with an upstanding neck 4. Within said casing is an expansible and contractible member which acts to automatically govern the valve proper of the device which will be hereinafter simply referred to as the "valve" and the shell 5 the body of which is spaced from the body of the casing 2, answers satisfactorily in this connection said shell being preferably made of comparatively thin metal such as aluminum.

The mounting and mode of operation of said shell will be hereinafter more fully pointed out.

As shown the casing is connected with the elbow or pipe connection 6 the inner terminal of which is illustrated as externally threaded for connection with a radiator. (Not shown.) The casing 2 is threaded into the outer enlarged portion of said elbow 6, said enlarged portion being furnished interiorly with a wall or diaphragm 7 having one or more ports as 8 by which the interior of the casing 2 is put into communication with the radiator.

In the construction shown the upper reduced portion of the shell 5 is clamped or fixed to the upper reduced portion of the casing 2 and for this purpose the clamping member 9 may be provided, the body of said clamping member being externally of cone form to engage the correspondingly-formed adjacent surface upon the interior of the head portion of said shell 5 and to press the same solidly and firmly against the similarly coned interior surface of the reduced portion 3 of said casing, said clamping member 9 having a shank 10 extending upwardly therefrom and tapped into the neck 4 of the casing 2. Fitted into said neck 4 is the plug 11 having a port 12 therethrough the lower portion of said port being tapered to present a seat for the conical valve 13 provided with a downwardly-extending elongated stem 14. The valve-seat plug 11 is held firmly in place by the plug 15 provided with an enlarged manipulating head 16 peripherally roughened to facilitate its operation and fitted by screwthreading into said neck. The engaging threads of the plug 15 and neck 4 as shown are right handed while those between the plug 11 and said neck are left handed so that as the plug 15 is rotated to engage the companion plug 11, the latter will not be turned. It will be clear that the threading of the two plugs might be reversed the object in view being to have the threads of said two plugs opposite. The clamping member 9 has one or more ports 17 therethrough and the plug 15 also has a similar port 18 opening to the atmosphere.

It will be assumed that the valve 13 is open at which time it uncovers the port 12. In this case cold air in the radiator passing therefrom enters the elbow 6, passing through the ports 8 in the wall 7, and also through holes in a disk hereinafter de-

scribed, into the casing 2 from which it escapes to atmosphere by way of the ports 17, 12 and 18. As will hereinafter appear when steam is admitted to the radiator, a small quantity of the same will enter the casing 2 through the connections described and its heat will cause the expansion of the shell 5 and the operation thereby of suitable means for instantly closing the valve 13 to prevent the escape of the steam to atmosphere.

That part of the stem 14 adjacent the valve 13, is slidably guided in a substantially central bore in the clamping member 9, and encircling said stem below said clamping member is the coiled spring 19 the outer end of which bears against said clamping member while the opposite end engages against a collar 19' on said stem, said spring exerting a constant tendency to force said valve open which is the normal relation or that which exists when steam is not on so that at such time cold air can freely escape from the radiators. The lower or inner end of the valve stem extends through and is guided in perforations formed approximately centrally in the wall 7 and the disk 20 which latter also has holes 21 for the passage of the cold air and steam at the appropriate times. Said disk 20 closely fits in a counterbore 22 in the outer portion of the elbow 6 by reason of which it is held securely in place. The stock 23 punched from said disk 20 to form the two holes 21 is bent at right angles to said disk and reduced at the free ends to present shouldered supporting or fulcrum lugs for the two rocking levers 24, the lower rim portion of the shell 5 resting on the short outer arms of said levers, the outer ends of which are bent up as at 25 to prevent undue lateral movement of said shell. The comparatively long inner end of one of the levers is forked, and the inner end of the other lever extends between the branches of the forked end thus presenting a simple and compact means by which said levers can be crossed. The branches of said forked lever and the inner end of the other lever are furnished with upwardly bent ears 26 which bear against the under side of the washer 27 free or loose on the stem 14 and which as will hereinafter appear is adapted to apply a yieldable effect to the stem 14 in a direction to close the valve 13. It will be understood that said stem 14 extends between the branches of the forked lever and through an opening or perforation in the other lever. Fastened as by pinning, to the valve stem 14, is the disk or plate 28 and between the same and the companion disk 27 is interposed the double bowed leaf spring 29 which is stronger than the spring 19 for a reason that will hereinafter appear. It should be observed that the distances between the points on said le-

vers engaged by said shell and the centers of motion of said levers are respectively much less than the distances between said centers and the points at which said levers apply their effects to the valve stem by reason of which a very small amount of expansion of said shell is necessary to close said valve.

It will be assumed that the radiator with which the coupling or elbow 6 is connected, contains no steam; there will of course in such an event be cold or substantially cold air in the radiator, so that the shell 5 will be in its contracted relation, the outer arms of the levers 24 being down and the inner arms thereof being up by reason of which the spring 19 by acting against the collar 19' will hold the valve 13 open in the manner already described and this relation will be maintained so long as there is no steam in the radiator. On the admission of steam into the radiator a small quantity thereof passes into the casing 2 in the manner already set forth, where it acts upon the shell 5 to cause the downward or inward expansion of the same. As the shell thus expands its lower portion will depress the outer arms of the two levers 24, the inner arms of said levers being elevated and acting against the disk or plate 27 apply an upward thrust thereto which in turn is transmitted to the strong spring 29 and by the latter yieldingly to the disk or plate 28 in a direction to move the stem 14 outward to close the valve 13, the parts being so proportioned and timed that the valve 13 will not be closed firmly against its seat until all the cold air has been discharged from the radiator and casing. The yieldable effect applied to the stem 14 in a direction to close the valve 13 is advantageous in that thereby the parts cannot be injured in case there is any abnormal expansion of the shell 5 as in such a case, the spring 29 will be further compressed without possibility of injury even though the valve 13 be solid against its seat.

What I claim is:

1. A device of the class described, comprising a casing provided with a part having a port opening to atmosphere, a valve cooperating with said port, a heat-expandable shell in said casing, a pair of crossed levers the outer portions of which are operatable by said shell on the expansion thereof, said levers being supported for rocking movement between their ends, and means engageable by the inner portions of said levers, for closing the valve.

2. A device of the class described, comprising a casing provided with a part having a port opening to atmosphere, a valve cooperating with said port, a heat-expandable shell in said casing, a pair of levers the inner portion of one of which has a fork,

the inner portion of the other lever extending between the branches of said fork, the outer portions of said levers being operatable by said shell on the expansion thereof, said levers being supported for rocking motion between their ends, and means engageable by the inner portions of said levers, for closing the valve on the expansion of said shell.

3. A device of the class described, comprising a casing provided with a part having a port opening to atmosphere, a valve in said casing, for controlling said port, spring means acting against the valve and tending constantly to maintain the same open, a heat expansible shell fastened in said

casing, and mechanism including spring means, for yieldingly transferring the motion of the free portion of said shell to said valve in a direction to close the latter, on the expansion of said free portion, said last mentioned spring means being of greater tension than said first mentioned spring means and both said spring means being inclosed by the casing.

In testimony whereof I affix my signature in presence of two witnesses.

CARL H. PETERSON.

Witnesses:

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