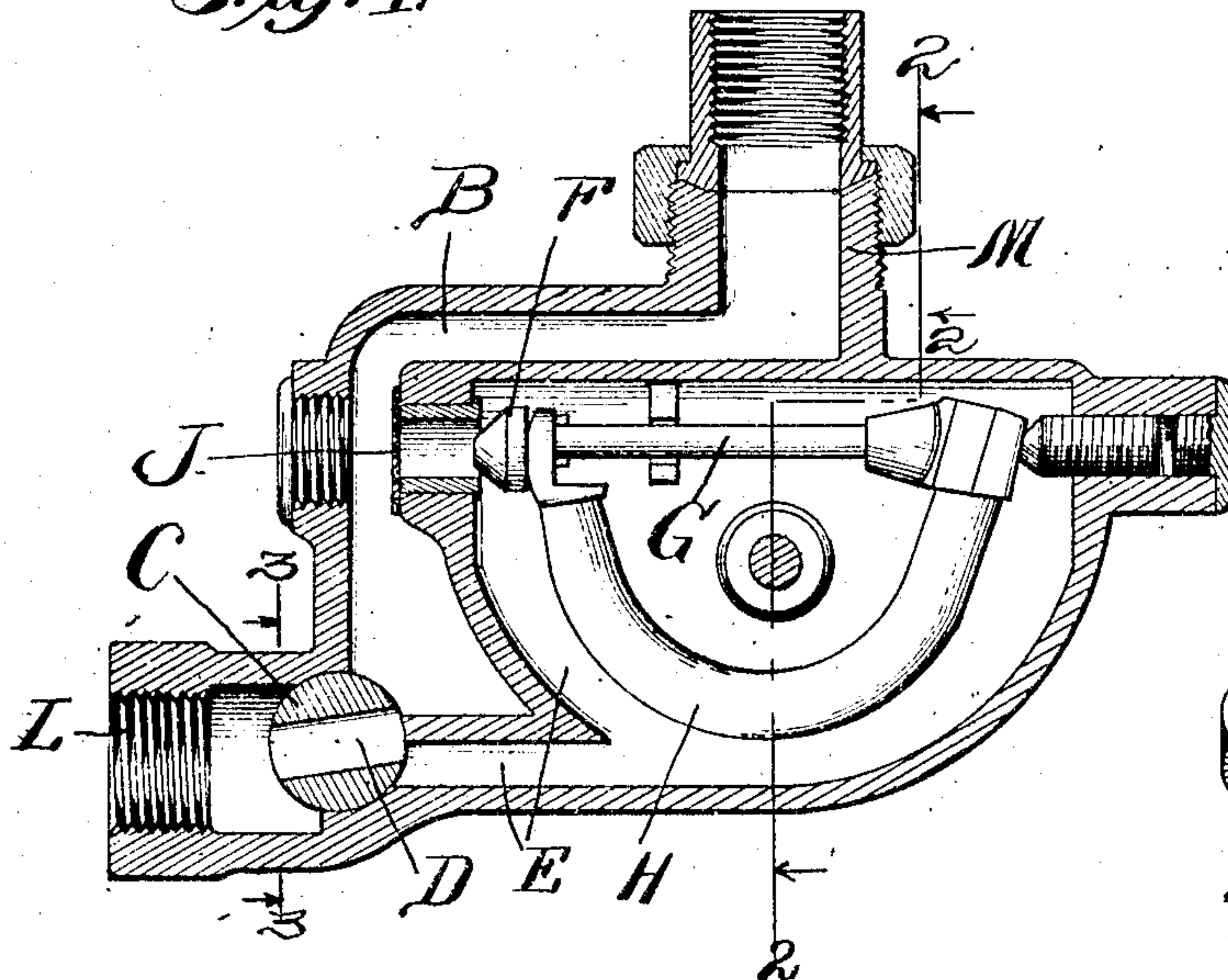


No. 887,513.

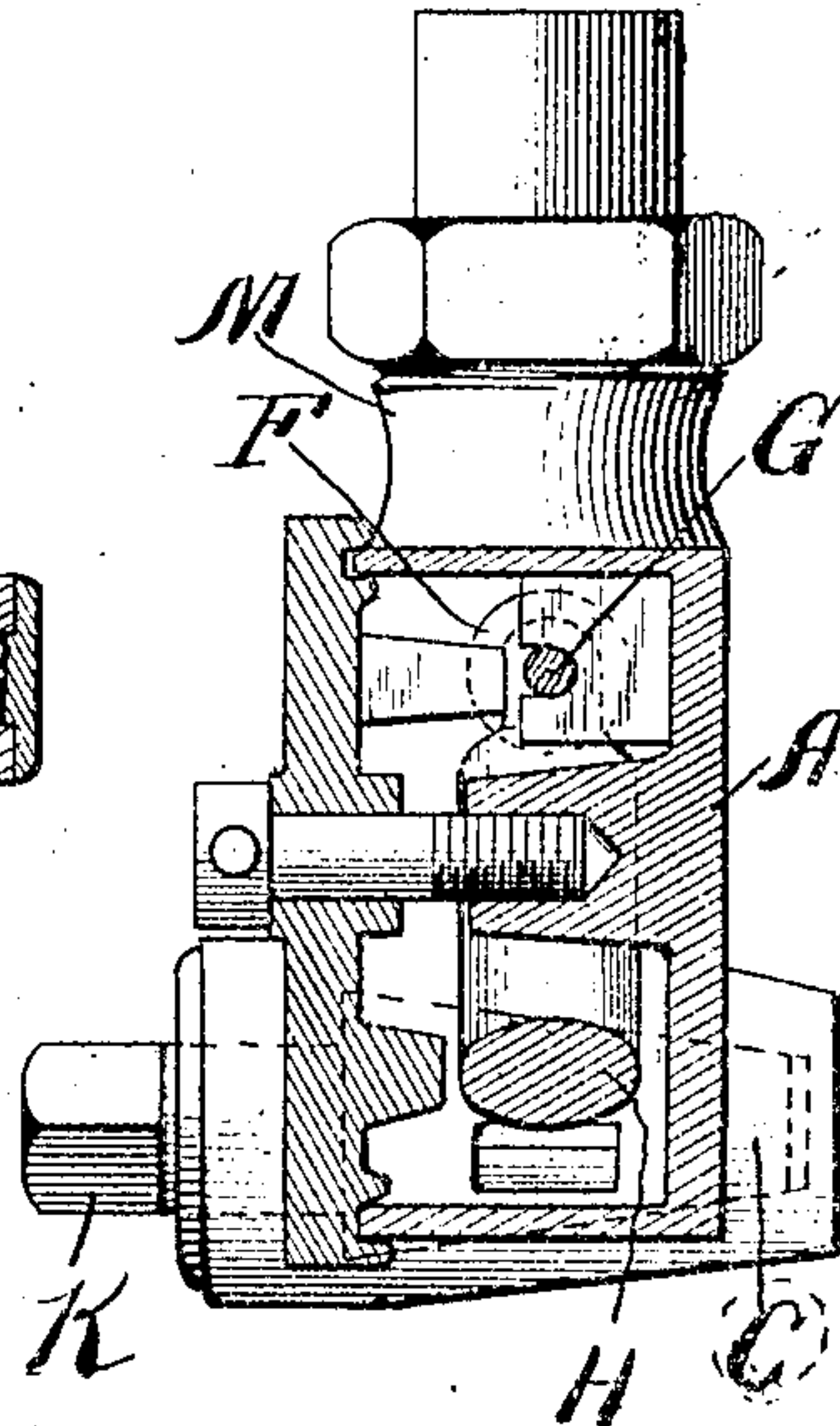
PATENTED MAY 12, 1908.

W. H. PEARCE.  
STEAM HEATING SYSTEM.  
APPLICATION FILED MAR. 7. 1904.

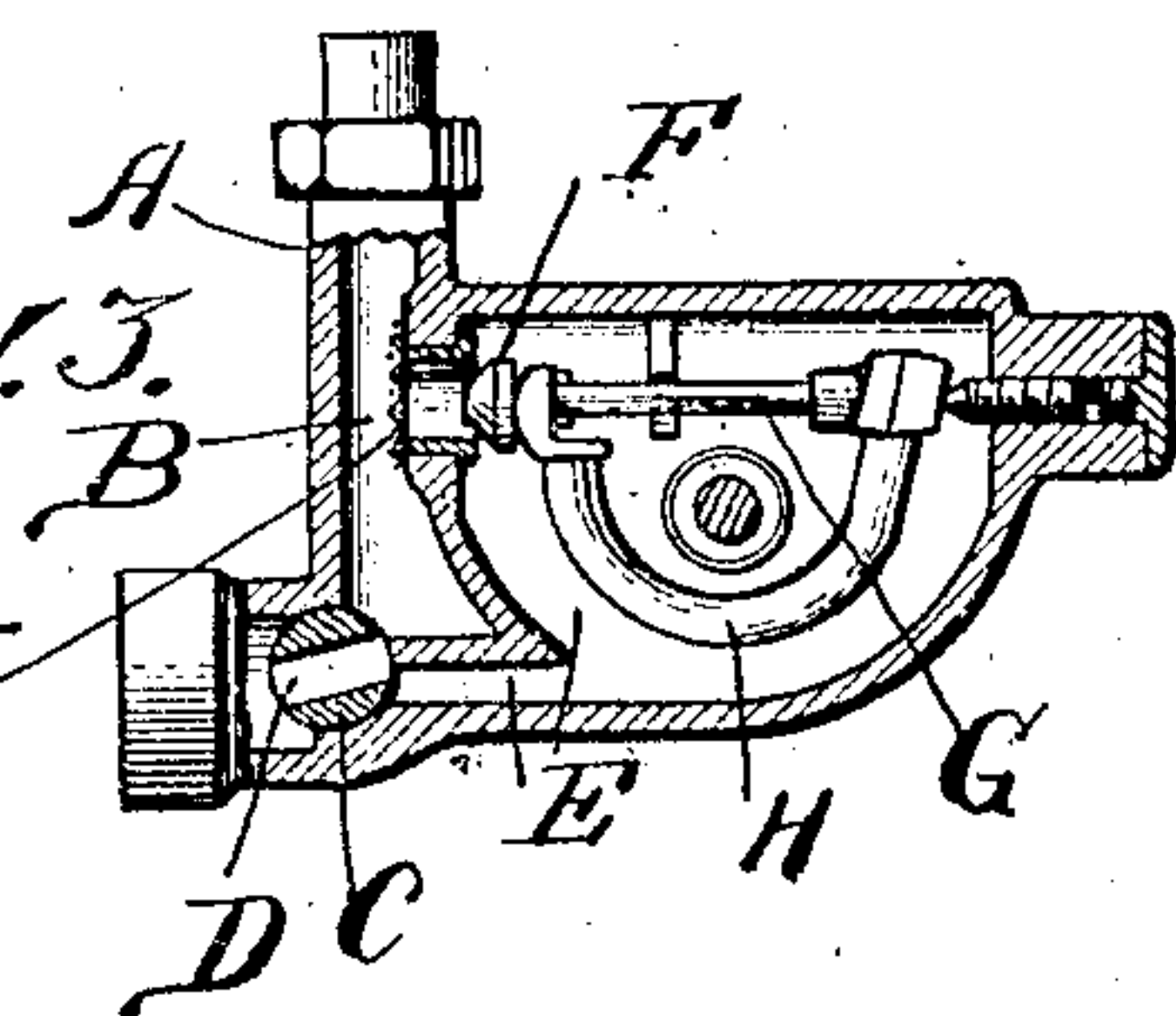
*Fig. 1.*



*Fig. 2.*



*Fig. 3.*



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# UNITED STATES PATENT OFFICE.

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## STEAM-HEATING SYSTEM.

No. 887,513.

Specification of Letters Patent.

Patented May 12, 1908.

Application filed March 7, 1904. Serial No. 196,887.

*To all whom it may concern:*

Be it known that I, WILLIAM H. PEARCE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Steam-Heating System, of which the following is a specification.

This invention relates to steam heating systems and particularly to an attachment for regulating the temperature of a steam heating system.

The object of the invention is to provide a steam heating system which is simple, inexpensive and efficient, and wherein are employed automatic or thermostatic attachments in connection with the radiators or radiating surfaces, whereby the supply of heating medium may be efficiently regulated.

A further object of the invention is to provide an attachment for use in connection with steam heating systems, which is simple and economical in construction and efficient in operation, wherein the presence of or excess of water of condensation, air, or other matter, tending to interfere with the maintenance of uniform temperature in the system or in the radiator is avoided.

A further object of the invention is to provide a location and relative arrangement of the parts of a heating system, including an automatic thermostatic attachment, wherein the condensation from the radiators or radiating surfaces may be efficiently drained, and wherein is avoided the trouble and annoyance resulting from unauthorized tampering with the apparatus.

Other objects of the invention will appear more fully hereinafter.

The invention consists, substantially in the construction, combination, location and relative arrangement of parts, all as will be more fully hereinafter set forth, as shown in the accompanying drawings, and finally pointed out in the appended claims.

Referring to the accompanying drawings, and to the various views and reference signs appearing thereon,—Figure 1 is a view in central section of an attachment for steam heating systems embodying the principles of my invention. Fig. 2 is a transverse section on the line 2, 2, Fig. 1, looking in the direction of the arrows. Fig. 3 is a view similar to Fig. 1 showing a slightly modified arrangement of attachment embodying my invention.

In steam heating systems it is customary to employ traps, and connect the same on one side directly to the radiator and on the other side to a return or drain pipe. This practice has developed certain objections, among which may be enumerated the necessity for providing special constructions of couplings or connections to effect the joining of the trap to the radiator or radiating surfaces, thereby increasing the cost of manufacture and installation of the plant. This objection is specially true where the trap is connected directly to the radiator and at its lowermost point, as is desirable in order to permit of the escape of the condensed water from within the radiating coils. In such case it becomes difficult and inconvenient to effect a coupling up of the trap to the radiator on account of the limited space usually available for such work. Moreover, the location of the trap at the radiator offers an attraction for unauthorized and unskilled tampering on the part of ignorant servants and others whereby the adjustments of the trap become deranged, and hence causing trouble and annoyance by reason of the heating system failing to work properly. Again, in the use of traps in connection with the radiators employed in steam heating systems, it is desirable to provide means whereby any accumulated rust particles, dirt, scale, mud or other deposit from the radiator or the steam pipes of the system may be blown off and removed.

It is among the special purposes of my present invention to provide a construction and arrangement of steam heating system and automatic thermostatic attachment in connection therewith wherein the above noted and other objections are avoided, and the benefits and advantages recited are secured in a most simple and efficient manner, and wherein is provided the passage through which the residue of the heating medium may be drawn at a uniform rate, thereby regulating the supply of the medium, and also wherein is employed an emergency means for ridding the regulator of the presence of any excess of water of condensation, or of air or other matter, tending to interfere with the uniform passage of the residue from the system.

In the present exemplification of the invention there is shown an attachment embodying the principles of my invention, and



comprising a casing A, through which is formed a passage B for the steam, water of condensation, or the like. Arranged to project across the passage is a plug valve C having an opening D therethrough, by which the area of free passage through the casing A may be regulated and controlled to any desired extent by suitably turning the plug valve C to the desired extent. The passage B forms the main steam passage through casing A. A by-pass or passage E, communicating with the main passage B at a point above the plug valve, and also delivering from the casing through the opening D in the plug valve, affords an auxiliary path for the passage of steam through the trap casing. This by-pass is controlled by a thermostatic valve F operated in any suitable manner, or by any suitable or desired thermostatic construction. This valve is preferably carried by a stem G having connection with the ends of a U-shaped thermostat H in a well known manner, and which expands and contracts under the influence of variations in temperature. In this arrangement, the valve C is located at a point suitable to control the outlet of the passage B, and also of the by-pass E, and is provided with an opening or port D of suitable size to communicate simultaneously with the two ports. By adjusting the position of the port with relation to the outlets, the latter may be increased or decreased as desired.

The normal position of the valve F is unseated, thereby forming a free passage through the valve opening, by-pass E, and opening D in the valve C. At the same time there is a free passage through the port B and communicating opening D in the valve.

When the casing is chilled, or when there is no heating fluid passing through the system, the thermostatic valve F will assume its normal or open position. After the valve C has been adjusted to permit the desired amount of fluid to pass through the radiator, the action will be as follows: The heated fluid being admitted, will enter the passage B and pass through the opening into the by-pass, and out through the opening D in the valve C, until the thermostat becomes sufficiently heated to seat the valve F, thereby closing the opening to the by-pass. This valve will remain seated as long as the temperature is sufficiently high to operate the thermostat. The passage of the fluid will then be directly through the passage B and valve C.

The outlet of the passage B, which may be regulated by means of the valve C, is sufficient at all times, except when entirely closed, to permit any small quantity of water of condensation, and the air carried by the fluid, to pass out through the discharge L. The fluid will continue to flow

in this course as long as the temperature is sufficiently high to act upon the thermostat, and to also prevent a great amount of condensation. If the temperature is decreased, there will be an increased amount of condensation, and the water will rapidly accumulate. Under these conditions, the outlet of the passage B is not sufficient to permit the rapid escape of the increased amount of water, and the same will accumulate in this passage, thereby chilling the casing and also the thermostat, which will cause the latter to unseat the valve F. When the water has accumulated to a point in line with the entrance to the by-pass, it will flow therethrough and out through the valve D, thereby permitting the water to flow off rapidly. At the same time, the accumulated water in the passage B will also flow out through the valve opening D.

When the temperature is again raised, the fluid will first pass through the by-pass and act upon the thermostat to again automatically seat the valve F, which will remain seated until automatically unseated in the manner just set forth.

Obviously the valve C may be adjusted at any time, either before the fluid is admitted into the system or while passing therethrough, and may regulate the outlets of the passages to control the water of condensation and cause the thermostat to act either by a slight or a considerable decrease in the temperature.

Thus with an attachment constructed in accordance with the principles of this invention, the temperature of the radiator or radiating surface may be automatically regulated and controlled.

If desired, and in order to prevent particles of rust, scale, dirt or the like, from becoming lodged in the by-pass E, or in the seat of valve F, whereby said valve is prevented from seating properly in the operation of the device, a screen, indicated at J, may be placed over the entrance to said by-pass from the main passage E. The plug valve C may be provided with a stem K, as shown, and which is arranged to extend through the casing A, or a suitable stuffing box of packing gland, to a point outside of the casing, to afford means whereby said valve may be rotarily adjusted as may be desired. Ordinarily when this valve is once set or adjusted to secure or maintain a certain degree of temperature at the radiator or radiating surface, such adjustment does not require alteration or change unless it is desired to secure and maintain a different temperature of the radiator or radiating surface, in which case the valve C is rotarily adjusted so as to provide area of opening, as the case may be, of the main passage B through the opening D in the valve. The casing A is provided with the



usual threaded openings L M to afford means for attaching or connecting the trap in the return or drain pipe.

Ordinarily the valve C is adjusted so as to provide an area of opening of the main passage B sufficiently to enable the water of condensation generated during the ordinary operation of the device to pass through. Should, for any reason, an excess or abnormal amount of condensation take place within the attachment or within the radiator in connection with which the attachment is used, as for instance, in case the heat should be entirely shut off from the radiator for a considerable space of time and then the steam turned on, the by-pass which under the cooled condition of the radiator and attachment is opened affords means for taking care of such excess condensation, permitting the same to pass through the trap to the return pipe.

The construction shown in Fig. 3 is identical with that shown in Fig. 1, except that the main steam passage B is formed straight through the casing in the trap shown in Fig. 3.

In use, this improved attachment is interposed in the drain or return pipe connection and preferably near the ceiling of the room below that in which the radiator is located or beneath the floor of such room, the threaded openings L, M of the attachment affording means for attaching the drain or return pipe sections thereto. By thus locating the attachment below the floor of the room in which the associated radiator is located, said attachment is removed from danger of being tampered with unnecessarily, or by unauthorized or ignorant persons. However, by placing or interposing the attachments in the drain or return pipe sections, instead of connecting them direct to the radiators and then connecting the drain or return pipe sections to the attachment, the necessity of providing special fittings to effect the coupling of the attachment to the radiator is avoided, and the advantage of facilitating the work of attaching the attachments is obtained.

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

1. In combination, a casing having an inlet and an outlet, a main passage connecting and communicating with the inlet and

outlet, a by-pass leading from a point in the main passage to another point adjacent said outlet, a valve plug having a passage or port, arranged in said outlet, said port thereof being adapted to simultaneously partially overlap both said main passage and by-pass for regulating the outlet, a valve for controlling said by-pass, and means for actuating the last said valve, arranged out of operative relation to the main passage and in operative relation to said by-pass.

2. In combination, a casing provided with two passages, each of said passages having an inlet and an outlet, said outlets being located adjacent each other, a valve for simultaneously controlling both of the outlets, and means for automatically controlling the inlet of one of the passages.

3. In combination, a casing provided with two passages, each of said passages having an inlet and an outlet, said outlets being located adjacent each other, a valve for simultaneously controlling both of the outlets, a valve for controlling the inlet of one of the passages, and means for automatically operating the last said valve.

4. In combination, a casing provided with two passages, each of said passages having an inlet and an outlet, said outlets being located adjacent each other, a valve for simultaneously controlling both of the outlets, a valve for controlling the inlet of one of the passages, and means located in the said passage for automatically actuating the last said valve.

5. In combination, a casing provided with an outlet and having two passages provided with inlets and discharge outlets, said discharge outlets communicating with the outlet of the casing, a valve plug arranged in the outlet of the casing and provided with a passage or port, said passage or port being adapted to simultaneously partially overlap the discharge outlets of both of the passages for controlling the passages, and means for actuating the valve plug.

In witness whereof, I have hereunto set my hand this 27th day of February 1904, in the presence of the subscribing witnesses.

WILLIAM H. PEARCE.

Witnesses:

C. H. SEEM,  
S. E. DARBY.