March 22, 1927. 1,621,640

W. MOONEY

COMBINATION HEATING APPARATUS

Filed Jan. 7, 1926

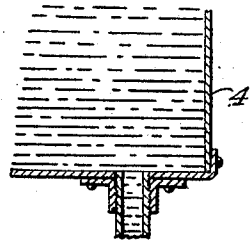


Fig. 1.

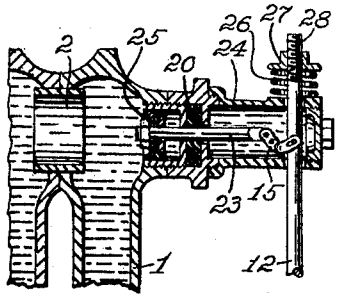
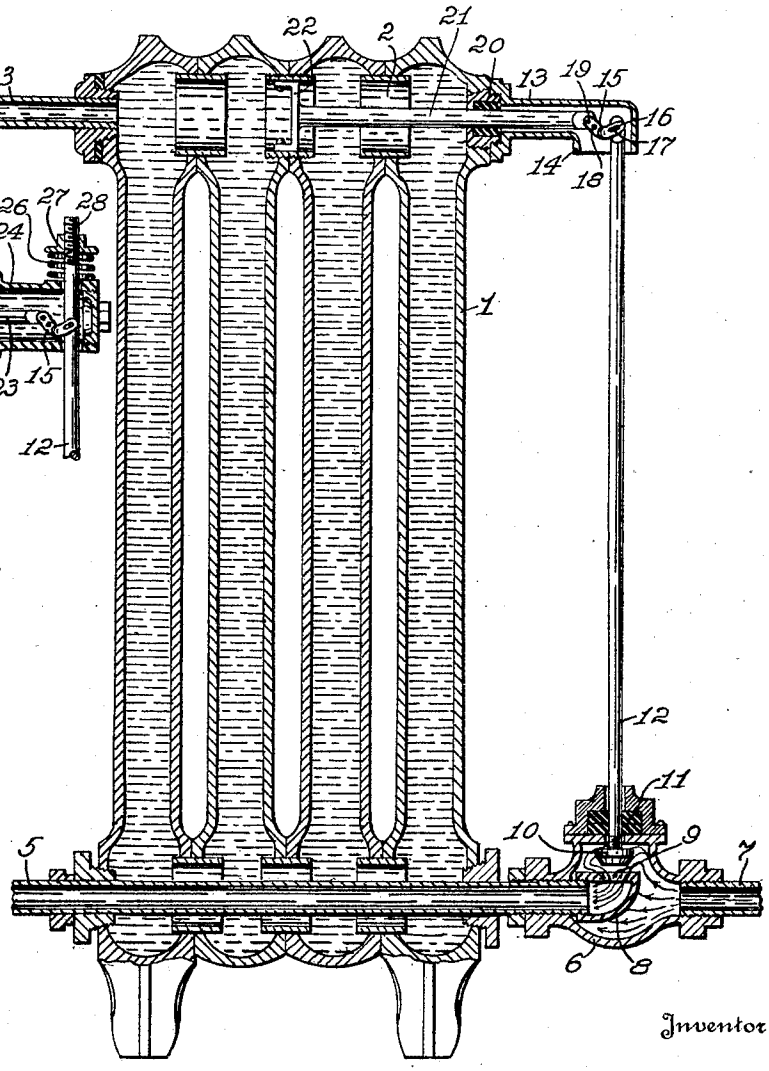


Fig. 2.



Inventor

William Mooney

By G. C. Kennedy.

Attorney

Patented Mar. 22, 1927. 1,621,640

UNITED STATES PATENT OFFICE.

WILLIAM MOONEY, OF WATERLOO, IOWA, ASSIGNOR OF ONE-HALF TO SATOLLI F. McGINN, OF WATERLOO, IOWA.

COMBINATION HEATING APPARATUS.

Application filed January 7, 1926. Serial No. 79,778.

My invention relates to improvements in heating apparatus, and the object of my improvement is to effect a combination system for heating by means of hot water directly and steam indirectly, the steam being utilized for heating the water, and provision being made for regulation of the steam delivery, the regulating means being directly actuated by the heated water.

This object I have accomplished by the means which are hereinafter described and claimed, and which are illustrated in the accompanying drawings, it being understood that changes in the precise embodiment of invention herein disclosed can be made within the scope of what is claimed without departing from the spirit of the invention.

In said drawings, Fig. 1 is a vertical longitudinal medial section of a heating radiator of the built up sectional type for heating directly by means of hot water, the view being diagrammatic, with parts broken away, and Fig. 2 is a like section, but showing a modification in the steam regulating means, which are illustrated in detail, fragmentarily, with other parts removed.

The radiator is built up of connected hollow sections 1 of a well-known type, having sleeve connections 2 above and below to permit circulation of water therethrough. One of these sections may be supplied with water at the top by a pipe 3 which may communicate with any source of water supply or with an expansion tank 4 located above the radiator.

The numeral 5 denotes a steam outlet pipe which centrally traverses the row of lower sleeves 2 and clamping screw plugs fitted in threaded seats in the end sections 1. This pipe 5 is in a steam circuit of piping to and from a source of steam under pressure, and at one end of the radiator includes a valve-chamber 6 in the communications, between said pipe 5 and an inlet pipe 7.

This valve-chamber and its regulating valve may be of any desired kind, other than that shown. The one illustrated comprises within said chamber 6 a closed hollow body 8 threaded upon the end of the pipe 5 and having a flat top provided with a beveled valve-seat 9 to receive and fit a beveled valve-head 10 adjustably mounted upon threads on the lower end of a vertical valve-rod 12 which traverses slidably a stuffing-box 11.

The numeral 21 denotes an elongated rod preferably of aluminum or other metal which possesses a high degree of coefficiency of expansion, and which has a rigid bracket connection 22 at one, its inner end, to and within one of the upper sleeves 2, it being understood that this sleeve is rigidly mounted in its seat, so that it becomes an abutment for this end of the rod.

The other end of the rod 21 is passed through a stuffing-box 20 outwardly and projecting into a casing 13 which is bracketed to the upper end of the outer section 1. This casing has a downturned open end 14 into which extends the upper end of the valve-rod 12. A bell-crank lever 15 has one end pivoted at 19 to the outer end of the rod 21, is fulcrumed near said pivot on a cross-pintle 18, and has its longer member provided with a short slot 17 to receive a pin 16 projecting from the valve-rod 12.

The valve-head 10 is to be adjusted upon the rod 12 so that it is spaced a proper distance above the valve-seat 9 when the water in the radiator sections 1 is cool. Steam then passing said valve-seat through the pipe 5 heats the water in the radiator in which it is immersed through conduction through the pipe but there is no communication between the pipe 5 and the interior water-containing space of the radiator. As the water becomes thus heated, the rod 21 gradually lengthens until a desired maximum temperature thereof is arrived at, by which time the valve-head 10 has nearly if not quite closed the valve-seat 9. The gradual contraction of the steam passage by way of said valve in shutting off the steam proportionally, correspondingly lowers the temperature of the water, or rather, tends to bring the temperature of the water in the radiator to the critical degree, whereby an even temperature is automatically maintained.

In this device the regulator shown in Fig. 1 is actuated by the heat extension of the rod 21, but in the modification illustrated in Fig. 2, a regulating device of a similar mechanically moving type is used, the expansion of heated water in the radiator serving as the motive agent. In this installation, no expansion tank 4 is used, as the water should be confined within the radiator closely, although any kind of well-known resiliently-controlled safety-release may be inserted in the radiator to eject water when compression has passed above a critical amount.

As the water, however, is usually not to be heated over a moderate temperature, an open-end cylinder of a proper capacity is placed in communication with the upper part of the radiator and detachably secured thereto and contains a flexibly packed imperforate piston 25, the latter having a stem 23 slidably traversing the apertured closed end of the cylinder and also a stuffing-box 20 to enter a bracketed hollow casing 24 which is closed at its outer end by a removable plug. The casing 24 has vertically alined apertures near its outer end through which is passed the upper part of the valve-rod 12 to project thereabove with a threaded end 28 carrying a compression-nut 27. A coiled compression-spring 26 is engaged between the top of said casing and said nut 27, and the latter may place the spring under an adjustable compression.

As the radiator water is heated it expands, and pushes the piston 25 into said cylinder, to cause its stem to rock the bell-crank lever 15 to lower the valve-rod 12, thus causing the valve-head 10 to control the steam passing through the valve-seat 9, in like manner to the first-mentioned regulating device.

It will be understood that in this manner all the radiators assembled in a building may be automatically controlled, and independently regulated, and that the two means described for actuating the regulating device, as well as others of the genera, are included in my invention, the gist of which is the regulation of the steam pressure by the water condition automatically.

This invention thus confers upon the user the benefit of water heating of an evenly maintained desired maximum temperature, while using an easily generated steam supply for the heating agent, more responsive and economical than more complicated kinds of heating apparatus.

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

A combination heating apparatus, comprising a water-containing radiator, a water containing supply reservoir above, in communication with said radiator, to supply water thereto under head and to also serve as an expansion receiver for water heated in the radiator, a valve-controlled steam conduit in said radiator, an operating element also in said radiator spaced from said conduit and responsive to the temperature of the water, and operating connections between and moved by said element when so influenced to actuate the steam-conduit valve to regulate steam-passage and the heating of the water in the radiator.

In testimony whereof I affix my signature.

WILLIAM MOONEY.