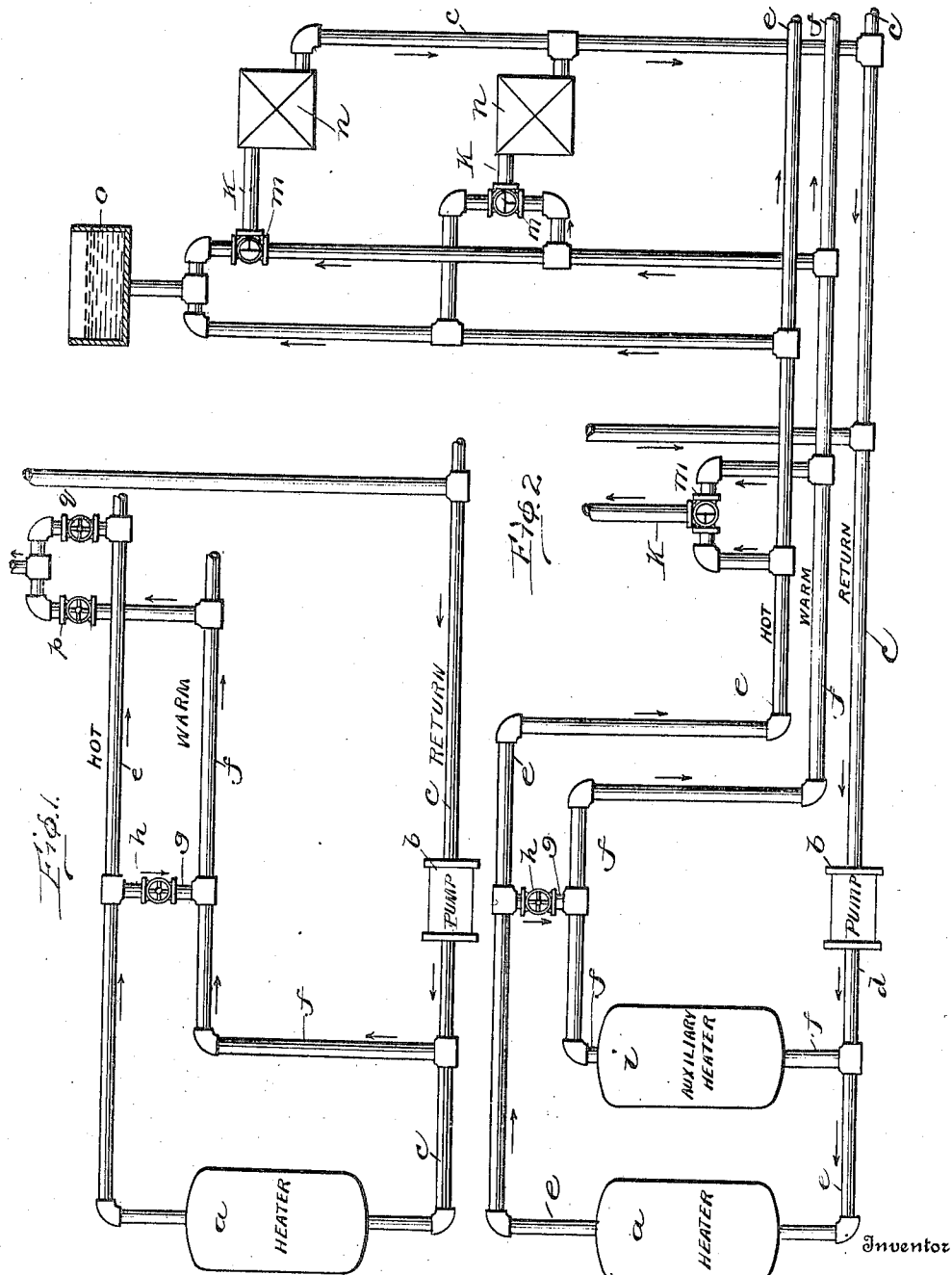


H. A. BOLZE.
HOT WATER HEATING APPARATUS.
APPLICATION FILED SEPT. 25, 1905.

971,966.

Patented Oct. 4, 1910.



Witnesses:
T. O. Priest
E. H. Hildebrand

334

Inventor
Heinrich Athanasius Bolze
George J. Maple
Attorneys

UNITED STATES PATENT OFFICE.

HEINRICH ATHANASIVS BOLZE, OF HANOVER, GERMANY.

HOT-WATER HEATING APPARATUS.

971,966.

Specification of Letters Patent.

Patented Oct. 4, 1910.

Application filed September 25, 1905. Serial No. 279,973.

To all whom it may concern:

Be it known that I, HEINRICH ATHANASIVS BOLZE, a subject of the Emperor of Germany, residing in Hanover, in the German Empire, engineer, having invented certain new and useful Improvements in Hot-Water Heating Apparatus, of which the following is a specification.

This invention relates to a hot water heating system having forced circulation, and has for its object the provision of means whereby the temperature of the several radiators of the system may be varied both collectively and independently.

The salient feature of the invention is the provision of a plurality of mains carrying water of different temperatures, one being highly heated and the others to a much less degree. These supply mains are so connected to the intake of the respective radiators or radiator-groups that the radiator may be supplied with the hottest water or with a mixture, without affecting in any way the supply to other radiators or radiator-groups. Furthermore, provision is made for connecting the mains or trunk supply pipes in such way as to supply a mixture of the water having an average temperature, to the whole system.

The invention as hereinafter more fully described and as particularly set out in the claims, will be readily understood from an inspection of the accompanying drawing, in which—

Figure 1 is a diagrammatic representation of one embodiment of the invention; and Fig. 2 is a similar view of a complete system possessing certain additional features.

As illustrated in Fig. 1 *a* is a heater inserted in the system.

b is a pump driven in any suitable manner and causing a forced circulation of the water.

c is a return main leading from the radiators to the pump *b* whence the returning water is forced through pipe *d* which branches into two pipes *e* and *f*, the pipe *e* leading through the heater *a* and serving as a hot water main, while the pipe *f* serves as a warm water main for the radiators. A by-pass *g* leads from the hot water main *e* to the warm water main *f* and is provided with a valve *h* by means of which a portion of the hot water may be introduced to the

warm water main sufficient to compensate for loss by radiation. As shown in Fig. 2, this compensatory heat is supplied to the main *f* by a second or auxiliary heater *i* inserted therein, but in this case also the by-pass *g* may be used, by the opening of the valve *h*, to transfer a portion of the highly heated water from the main *e* to the main *f* when it is desired to raise the temperature of the water supplied to the whole system.

The feed pipe *k* of the individual radiators or radiator-groups communicates with both the hot and warm water mains by connections having inserted therein a three-way cock *m* by which the radiators *n* may be supplied with water from the hot water main alone or from the warm water main alone, or from both. Instead of the three-way cock, separate valves *p* and *q* may be employed as will be obvious.

o is an expansion vessel arranged at the highest point of the system, as is usual.

The return main *c* leads the water from the radiator outlets to the pump *b*, whereby a complete circuit is established and maintained.

Under normal circumstances all the radiators are fed by the warm water main alone. In case of cold weather the valve *h* is opened and the temperature of the water in the main *f* is raised to an average higher point for the whole system. If a particular room is exposed or a higher temperature desired, the valves *p* and *q*, or the valve *m* controlling the supply to that particular radiator or radiator-group, are so manipulated as to shut off the supply from the warm water main and take in water of a high temperature from the hot water main alone. Likewise, if a particular radiator or radiator-group has been cut out and it is desired to heat the same again quickly, it is also placed in communication with the hot water main alone until it is thoroughly heated, when the valves may be shifted to introduce water from the warm water main or a mixture of the two. It will thus be seen that by means of the bypass *g* the temperature of the water supplied from the mains *e* and *f* to all the radiators in the system is under the immediate control of the engineer and may be modified at will independent of the heater *a*, while by the valves *p* and *q* or *m* the occupant of each room is enabled to control the temperature of the radiators therein without

interfering with the circulation of the water through the radiators or affecting the other units of the system.

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

10 1. In a circulating hot water heating system, the combination, with a hot water supply main, a warm water supply main, radiators, a return main, and heating means inserted in the circuit, of valved connections between each of the supply mains and the intake of the respective radiators, a direct connection from the outlet of each radiator to the return main, and a valved by-pass from the hot water main to the warm water main.

20 2. In a circulating hot water heating system, the combination, with a hot water supply main, a warm water supply main, radiators, a return main, and heating means inserted in the circuit, of a three-way valve connecting the two supply mains to the intake of the respective radiator, a direct con-

nection from the outlet of each radiator to the return main, and a valved by-pass from the hot water supply main to the warm water supply main.

3. In a circulating hot water heating system, the combination, with a heater, a hot water supply main fed thereby, a warm water supply main, radiators, a return main leading to the heater and also to the warm water supply main, a valved by-pass from the hot water supply main to the warm water supply main, valved connections between each of the supply mains and the intake of the respective radiators, and a direct connection from the outlet of each radiator to the return main.

40 In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HEINRICH ATHANASIVS BOLZE.

Witnesses:

EMMA WHITE,
ANNA DIPPEL.