March 3, 1936. E. KÄGI 2,032,660

HEATING APPARATUS

Filed Sept. 13, 1934 2 Sheets-Sheet 1

Fig. 1.

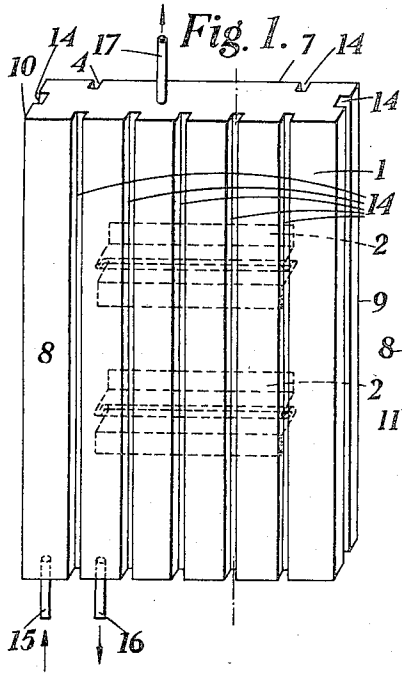


Fig. 2.

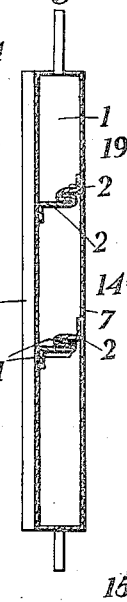


Fig. 9.

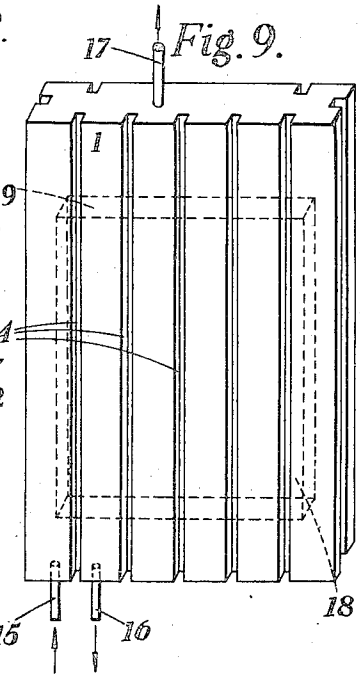


Fig. 3.

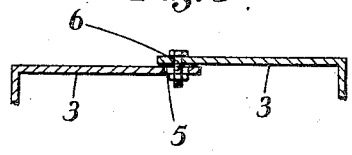


Fig. 4.

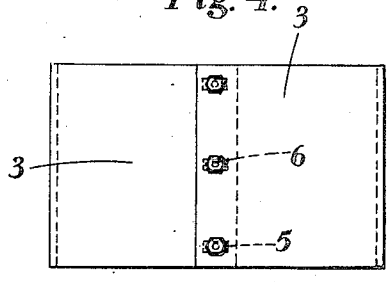
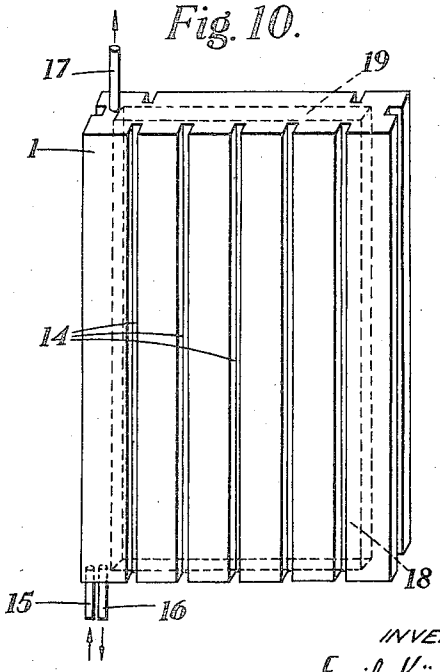


Fig. 10.



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March 3, 1936. E. KÄGI 2,032,660

HEATING APPARATUS

Filed Sept. 13, 1934 2 Sheets-Sheet 2

Fig. 5.

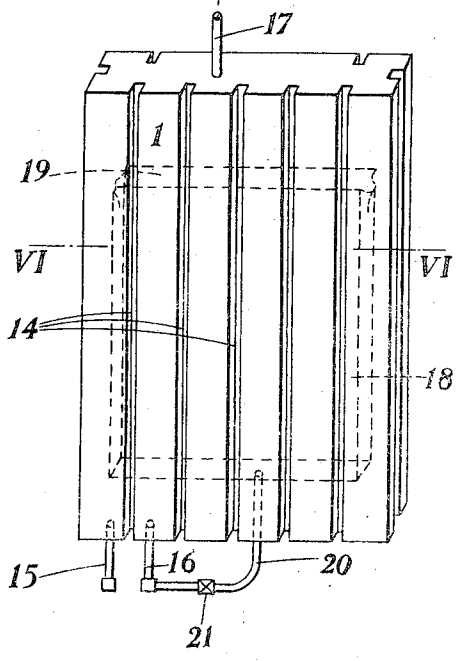


Fig. 7.

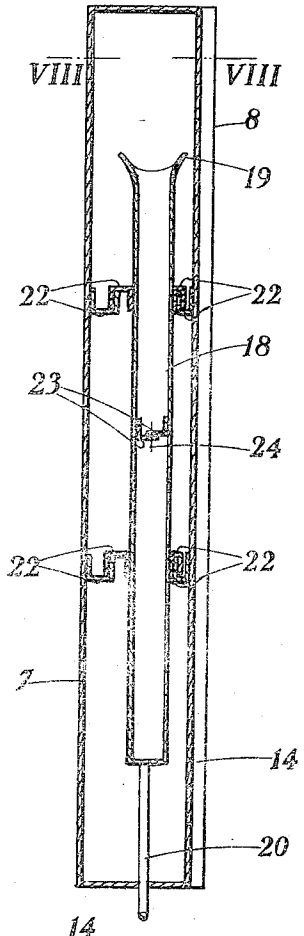


Fig. 6.

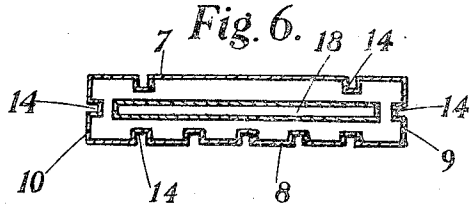
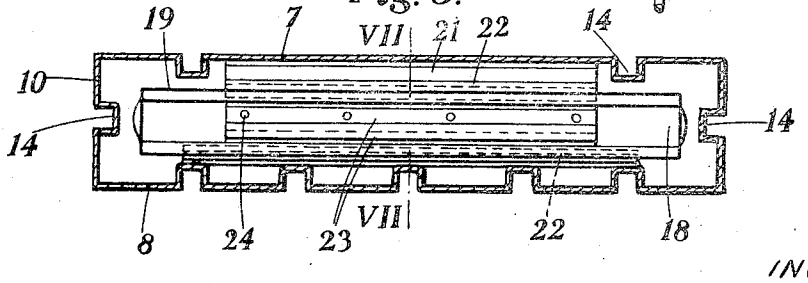


Fig. 8.



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UNITED STATES PATENT OFFICE

2,032,660

HEATING APPARATUS

Emil Kägi, Wadenswil, Switzerland

Application September 13, 1934, Serial No. 743,824
In Switzerland December 12, 1933

4 Claims. (Cl. 237—66)

I have filed an application in Switzerland on the 12th December, 1933 and Germany on the 14th December, 1933.

The present invention relates to improvements in heating apparatus, more particularly apparatus for use with hot water central-heating installations.

The object of the invention is to provide an expansion vessel for hot water central-heating installations, which serves at the same time as a heating apparatus or radiator.

Hot water central-heating installations usually comprise a considerable number of heating apparatus or radiators and only one expansion vessel, which is usually located in an upper part of the building and performs normally only the function of compensating for the variations in the water column due to variations in the temperature of the water. As a rule, these expansion vessels are insulated so as to avoid any loss of heat.

The main feature of the invention is to construct an expansion vessel for use with hot water central-heating installations in such a manner that it can serve the double function of an expansion vessel and a radiator.

Hitherto expansion vessels have been usually made of round or spherical shape, which is the most favourable one as regards resistance against the internal pressure occurring in the vessel. On the other hand, the usual round or spherical expansion vessels have the disadvantage that they do not utilize well the available space and are entirely unsuitable for use as heating apparatus or radiators.

According to the invention these drawbacks are avoided by making the expansion vessel of rectangular section and generally constructing the expansion vessel in such a manner that it can be simultaneously used as a radiator. For this purpose the walls of the vessel are made of a suitable shape so as to radiate a considerable amount of heat. The long sides of the improved expansion vessel are arranged parallel to each other and they are given the required resistance against internal pressure by being anchored against each other.

The accompanying drawings show several constructions embodying the features of the invention.

Fig. 1 is a perspective view of one construction.

Fig. 2 is a section on line II—II of Fig. 1.

Fig. 3 shows in section a modified construction of anchoring means, and

Fig. 4 is a top view corresponding to Fig. 3.

Fig. 5 shows in perspective view another construction of the improved expansion vessel.

Fig. 6 is a cross section on line VI—VI of Fig. 5.

Fig. 7 shows another construction in sectional elevation.

Fig. 8 is a cross section on line VIII—VIII of Fig. 7.

Fig. 9 shows a modified construction having a closed inner vessel, and

Fig. 10 shows a further modification.

Referring first to Figs. 1 to 4, 1 represents an expansion vessel of substantially rectangular shape, the long sides 7, 8 of which are provided with grooves 14 for the purpose of increasing the heat radiating surface. Grooves 14 may also be provided in the small sides 9, 10 of the radiator, as shown in Fig. 1. In the middle portion of the expansion vessel there is provided means for anchoring together the long sides of the vessel. As shown in Fig. 2 the anchoring means comprises plates 2, 2 fixed in any suitable manner to the long sides 7, 8 of the vessel. The plates are hook-shaped at their inner edges 11 so that they engage each other. By the provision of this anchoring means the long sides are given the required resistance against internal pressure and prevented from undue deformation.

Instead of the hooked plates 2, shown in Fig. 2, L-shaped plates 3 can be used, as shown in Fig. 3, which are again fixed to the long sides of the expansion vessel and are connected at their inner edges by means of screws 6, one of the plates 3 being, for this purpose, provided with a round hole 4 and the other plate with an elongated hole 5. This construction has the advantage that it provides for a small play in the transverse direction of the vessel. The latter arrangement has the advantage of enabling the anchoring means to be tightened or adjusted as required.

Water is admitted to the expansion vessel through a pipe 15 and discharged from the vessel through a pipe 16, an over-flow pipe 17 being provided at the top of the vessel.

In the constructions according to Figs. 5 to 8, there is, within the expansion vessel 1, an inner vessel 18 which is open at the top and is likewise of rectangular section as shown particularly in Fig. 7. When the water led into the outer vessel 1 rises to a sufficient extent, the inner receptacle receives water from the outer vessel. Water overflows into the inner vessel 18 from the expansion vessel 1 through an overflow spout 19. This arrangement has the advantage that the water rises more rapidly in the outer vessel and that consequently the vessel becomes hot more

rapidly. Water can be discharged from the inner vessel through pipe **20** and valve **21**.

The inner charging vessel **18** might, if preferred, be extended up to the top of the outer vessel **1** and then be provided with an overflow in place of the spout-shaped opening **19**. The inner vessel might also be extended right to the bottom of the outer vessel and the admission and discharge pipes might then be suitably re-arranged. It is not essential that the section of the inner vessel should correspond with that of the outer vessel. In some cases the inner vessel **18** may be an entirely closed container (see Fig. 9) or the inner vessel may be extended to the top and to the bottom of the outer vessel so that the two vessels have a common top and a common bottom (see Fig. 10). The vessel **18** may also be replaced by a solid body.

The walls of the inner and the outer vessel may be anchored together to increase their resistance to the inner pressure. For this purpose, in the construction shown in Figs. 7 and 8, members **22** of U cross section are fixed to opposite walls of the two vessels in such a manner that their inner limbs engage. The walls of the inner vessel **18** are reinforced by transverse members **23, 23** of angle section, which are fixed to opposite walls of the inner vessel and have their horizontal limbs connected by screws **24**.

It will be understood that other means for reinforcing the walls of the containers may be used within the scope of the invention.

I claim:

1. An expansion vessel for hot water central-heating installations constructed as a radiator and comprising in combination: an outer vessel of substantially rectangular cross section having long sides and short sides, the long sides being provided with grooves; an inner displacing body within said outer vessel; means for anchoring opposite long sides of the inner displacing body and the outer vessel against each other; means for anchoring the long sides of the inner displacing body against each other; and means for admitting water to the outer vessel, means for discharging water from the outer vessel, and means for discharging water from the inner displacing body, substantially as described.

2. An expansion vessel for hot water central-heating installations constructed as a radiator and comprising in combination: an outer vessel of substantially rectangular cross section having long sides and short sides, the long sides being provided with grooves; an inner vessel within said outer vessel; means for anchoring opposite long sides of the inner vessel and the outer vessel against each other; means for anchoring the long sides of the inner vessel against each other; and means for admitting water to the outer vessel, means for discharging water from the outer vessel, and means for discharging water from the inner vessel, substantially as described.

3. An expansion vessel for hot water central-heating installations constructed as a radiator and comprising in combination: an outer vessel of substantially rectangular cross section having long sides and short sides, the long sides being provided with grooves; an inner vessel within said outer vessel, said inner vessel being closed at the bottom and open at the top to receive water rising within the outer vessel; means for anchoring opposite long sides of the inner vessel and the outer vessel against each other; means for anchoring the long sides of the inner vessel against each other; and means for admitting water to the outer vessel, means for discharging water from the outer vessel, and means for discharging water from the inner vessel, substantially as described.

4. An expansion vessel for hot water central-heating installations, comprising in combination: an outer vessel of substantially rectangular cross section having grooved long sides, and short sides; said outer vessel being closed at the bottom and at the top; means for admitting water to said outer vessel; means for discharging water from said outer vessel; overflow means associated with said outer vessel; an inner vessel within said outer vessel, said inner vessel being closed at the bottom and open at the top; means for discharging water from said inner vessel; means for anchoring opposite long sides of the inner and the outer walls against each other, said means comprising U-shaped members engaging each other with their inner limbs and fixed with their outer limbs to said opposite walls; and means for anchoring the opposite long sides of the inner vessel comprising angle-shaped bars fixed to said walls and means for connecting said angle-shaped bars, substantially as described.

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