L. B. PIPER.

HEATER.

APPLICATION FILED OCT. 2, 1907.

914,455. Patented Mar. 9, 1909.

3 SHEETS—SHEET 1.

Fig. 1.

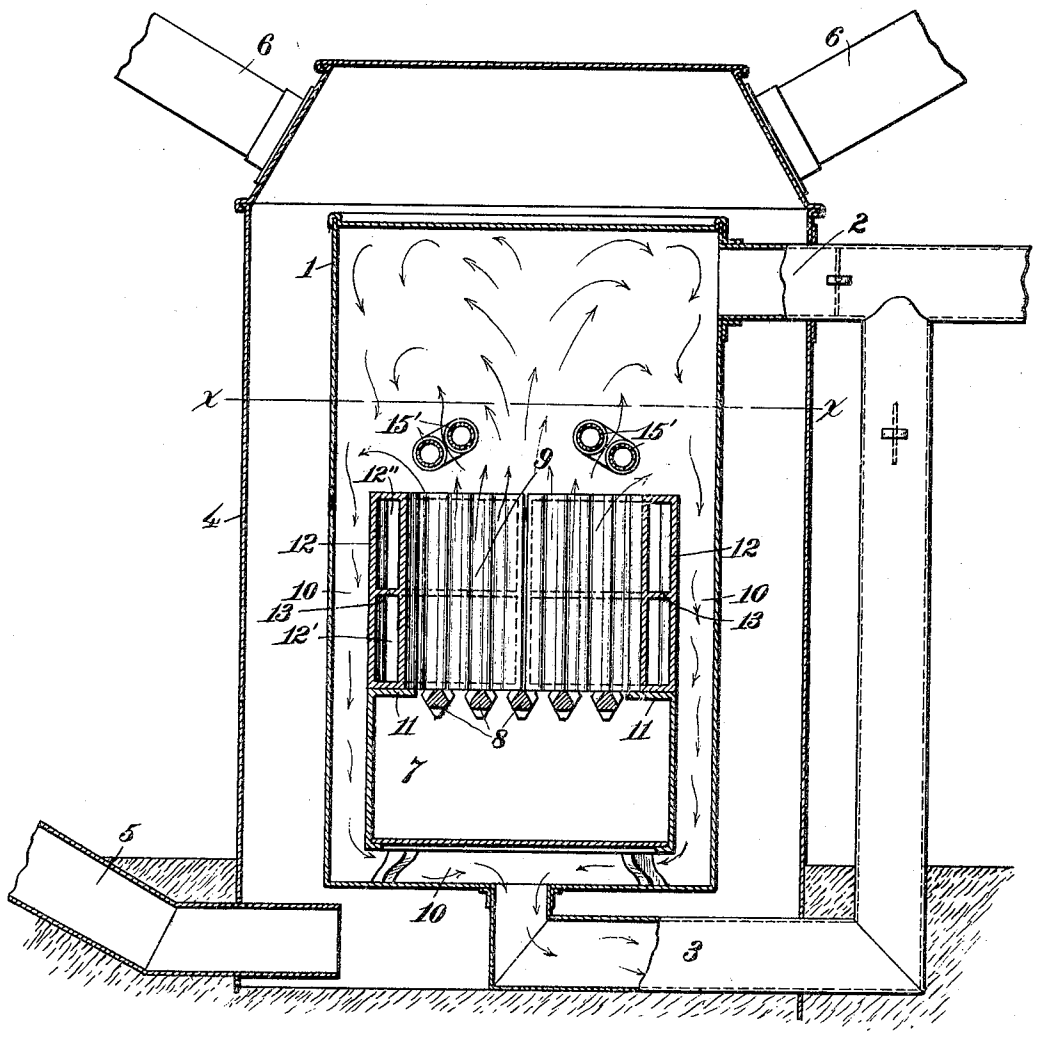


Fig. 7.

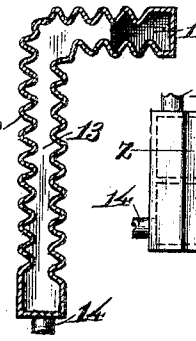
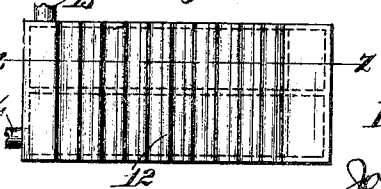


Fig. 6.



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3 SHEETS—SHEET 2.

Fig. 2.

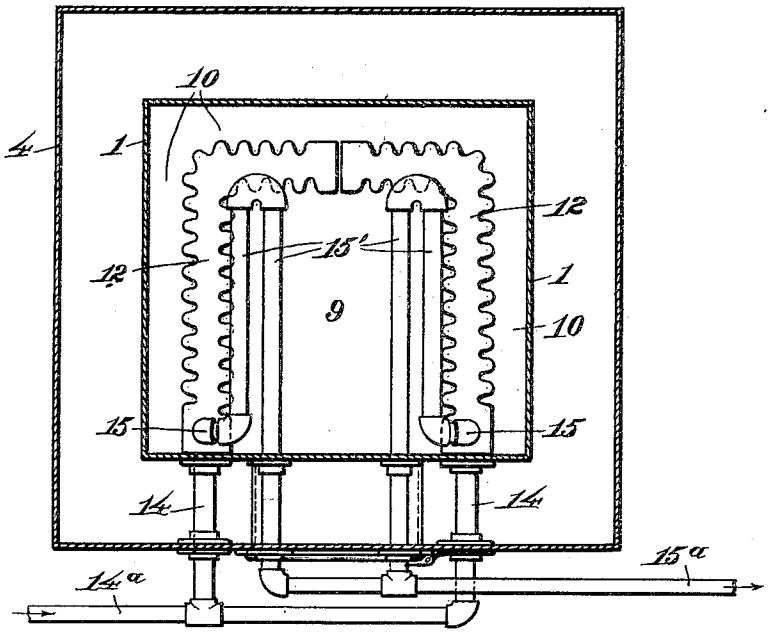
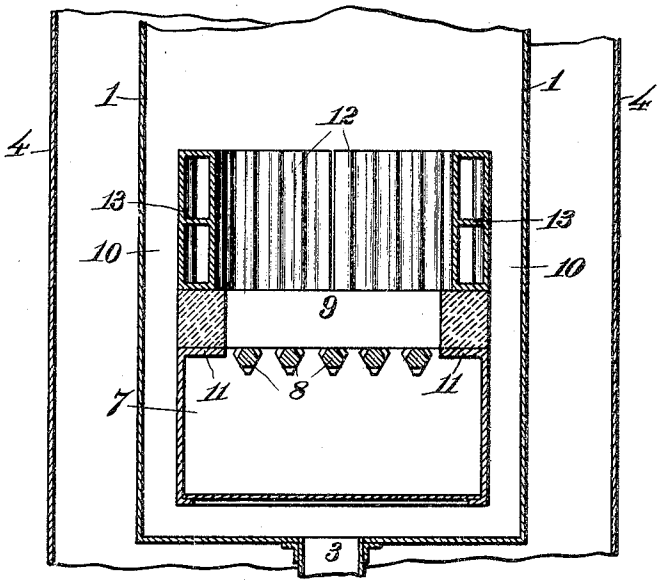


Fig. 3.



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3 SHEETS—SHEET 3.

Fig. 4.

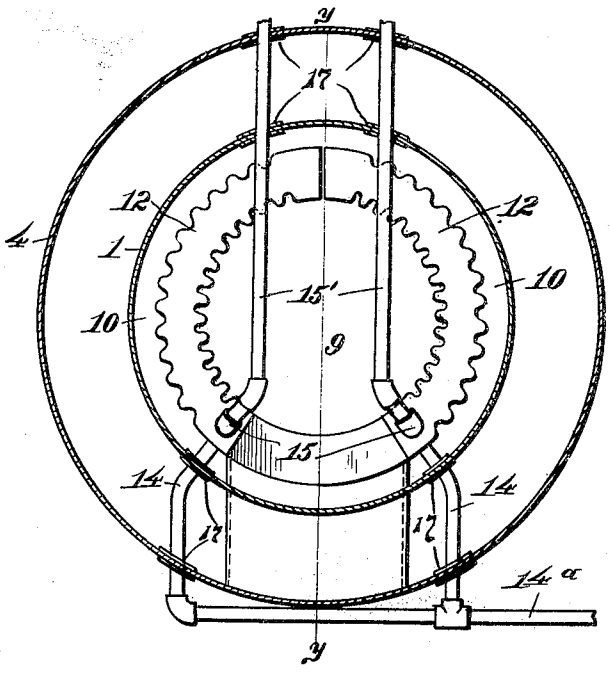
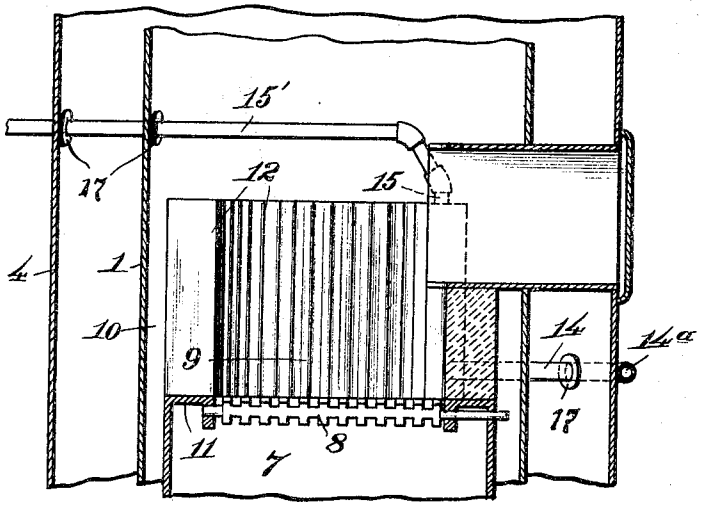


Fig. 5.



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UNITED STATES PATENT OFFICE.

LOUIS B. PIPER, OF CHICAGO, ILLINOIS.

HEATER.

No. 914,455. Specification of Letters Patent. Patented March 9, 1909.

Application filed October 2, 1907. Serial No. 395,532.

To all whom it may concern:

Be it known that I, LOUIS B. PIPER, a citizen of the United States, residing at Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Heaters, of which the following is a specification.

My invention relates to heaters and has particular reference to hot water heaters.

More specifically my invention relates to hot water heaters designed to augment the heating capacity of a hot air furnace.

The object of my invention is to provide a supplementary hot water heater which may be readily applied to a hot air furnace to increase its heating capacity and particularly to heat such rooms as are too far removed from the furnace to be adequately heated by the hot air system, or rooms which have been added to the building since the installation of the hot air system.

A further object is to provide a heater as mentioned, which, when in use, will not reduce the heating capacity of the furnace for heating the rooms already supplied with the hot air system.

A further object of my invention is to provide a heater of the character mentioned which may be arranged within a hot air furnace which is already installed without changing the construction of the furnace or altering its internal arrangement.

Other objects will appear hereinafter.

With these objects in view my invention consists generally in the heater and the combination and arrangements of its parts all as will be hereinafter fully described and particularly pointed out in the claim.

My invention will be more readily understood by reference to the accompanying drawings forming a part of this specification and in which,

Figure 1 is a vertical section of a square furnace equipped with my novel hot water heater, Fig. 2 is a horizontal section on substantially the line *x*—*x* of Fig. 1, Fig. 3 is a view, similar to Fig. 1, illustrating a portion of the furnace and the arrangement when a heater of smaller capacity than that illustrated in Fig. 1 is used, Fig. 4 is a horizontal section, similar to Fig. 2, illustrating the device arranged within a round furnace, Fig. 5 is a fragmentary vertical section on the line *y*—*y* of Fig. 4, Fig. 6 is an elevation of one of the heater sections as designed for a square furnace, and Fig. 7 is a section on the line *z*—*z* of Fig. 6.

It is frequently the case that a hot air furnace is found inadequate to properly heat some of the rooms of the building in which it is installed, especially such rooms as are remote from the furnace. In such cases a supplementary heater must be provided. If this be a separate heater, additional labor and expense is required to maintain a separate fire.

To avoid this, means have been devised for utilizing the heating plant already installed, by equipping the same with a supplementary hot water heater. But so far as I am aware all such devices, as have been heretofore placed on the market materially reduce the efficiency of the furnace as a hot air heater. This is mainly due to the fact that such devices interfere more or less with the proper circulation of the gases, preventing them from properly heating the dome or drum.

The primary object of my invention is to provide a supplementary hot water heater, to be arranged within a hot air furnace, and of such construction and arrangement that it will not detract from the heating qualities of the furnace as a hot air heater. To this end, I provide a heater to be arranged within a furnace and arrange the same to absorb and utilize the heat which is usually wasted by being absorbed by the non-heating portions of the furnace or by passing into the flues, without interfering with the proper or usual circulation of the hot air and gases within the dome.

The novel heater forming the subject matter of this application is particularly adapted for use in conjunction with hot air furnaces having indirect drafts and I have so illustrated it in the drawings.

Referring to the drawings, 1 indicates the dome or drum of a furnace provided with the smoke pipes, 2 and 3 the former of which is used only in starting the fire.

4 indicates the casing, 5 the cold air duct, and 6 the hot air pipes leading from the casing.

Suitably supported within the drum is the ash box, 7 and the grate, 8, which forms the bottom of a fire pot, 9. These are so arranged as to leave a downtake, 10 between them and the walls of the drum, forming a passageway for the gases to the flue, 3. The walls of the fire pot are usually formed of

suitable refractory material such as fire brick, resting upon the flange, 11 of the fire pot. In carrying out my invention, I provide suitable hollow members adapted to replace the refractory walls of the fire pot. These form a water jacket about the fire pot and are so constructed as to absorb the heat directly from the mass of live coals in the fire pot and from the inner layer of the current of hot air and gases passing downwardly through the passageway, 10, and are provided with suitable inlet and outlet pipes, the whole being so arranged as not to interfere in any manner with the normal circulation of the hot air and gases within the furnace.

The water jacket, above referred to, which surrounds the fire pot is formed of a plurality of corrugated members, 12 each of a size to permit being placed within the furnace through the feed door. Usually two members are sufficient although a greater number may be used if desired. Both walls of the members, 12, are corrugated to present a greater heat absorbing surface to the hot gases and the corrugations on the inner face are sufficiently deep and narrow to prevent the fuel from filling or clogging the corrugations. In this way the flame and hot gases are permitted to pass between the mass of live fuel and the inner walls of the members, 12, heating the water more effectually than if the coals are permitted to lie close against the wall. Each member is provided with a diaphragm, 13 and an inlet pipe, 14 and an outlet pipe, 15. The inlet and outlet pipes, 14 and 15 are arranged at one end of each member and the diaphragm, 13 extends almost to the opposite end of the member leaving a passage, 16 for the water to pass from the lower compartment, 12′ to the upper compartment, 12″. The water enters through the pipe, 14 into the lower compartment, 12′ of the member, 12, passes the length of said member rises through the passageway, 16 into the upper compartment, 12″ returns through the length of the member, passing out through the pipe, 15. As the water passes through the member, it is gradually heated and it is evident that the water in the lower compartment is much cooler than in the upper compartment. By thus separating the comparatively cool water from the thoroughly heated water, and by arranging the inlet pipe, 14 to discharge into the coolest portion of the member, I avoid the unpleasant "hammering" which is so common in some hot water heaters. The outlet pipe, 15 after leaving the member, 12, may be passed directly through the walls of the furnace, but I prefer to have it pass once or twice the depth of the drum to form a "floater", 15′. In Fig. 4 the outlet extends but once across the furnace passing through the back walls thereof. In Fig. 2 it is provided with a return bend and passes through the front walls. As before stated, each member, 12, is provided with a separate inlet and separate outlet pipe but these are united upon the outside of the furnace to common feed and supply pipes, 14ª and 15ª respectively.

17 indicate collars arranged upon the pipes, 14 and 15 where they pass through the drum and the casing to prevent the gases from the fire passing into the fresh air casing and to prevent the warm air from escaping from the casing about said pipes.

In Figs. 1 and 5 I have illustrated a water heater of great capacity wherein the members, 12 replace the whole of the walls of the fire pot. Such a heater is of sufficient capacity to supply quite a number of radiators. However, if a fewer number of radiators are to be supplied, the members may be made of less depth, and replace but the upper portion of the fire pot walls, as illustrated in Fig. 3. In other words, the depth of the member, 12 is governed by the number and size of the radiators to be supplied.

It is obvious that the heater herein described may be readily arranged within any indirect draft hot air furnace with but little trouble. It is also obvious that it does not interfere with or lessen the heating capacity of the furnace as a hot air heater. Further the device is a great fuel saver as the greater per cent. of the heat which is absorbed is that which would otherwise be lost or rendered of little value in heating the building, such as that which is absorbed by the walls of the fire pot and a large percentage of that which would normally be lost through the flue 3. Further, no change is required in the internal construction or the arrangement of the furnace. All that is required is to remove sufficient of the wall of the fire pot to accommodate the members, 12, and connect the pipes, 14 and 15 through the walls of the furnace to the pipes leading to and from the radiators.

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

In a hot air furnace the usual drum and casing in combination with an ash box arranged within said drum and spaced from the walls thereof, there being, a feed opening extending through the walls of said casing and drum above said ash box, a smoke flue extending centrally from below said ash box a plurality of hollow corrugated water containing members resting on said ash box and forming a fire pot and also a downtake for the hot gases between said members and the walls of said drum, said members together extending around said fire pot from one side of said feed opening to the other said downtake likewise extending uninterruptedly around said fire pot, a common feed pipe connected to each of said members and each of

said members having an outlet pipe extending substantially horizontally across said fire pot and thence through the walls of said drum and said casing and connected upon the outside of the casing with a common outlet pipe, substantially as described.

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

LOUIS B. PIPER.

Witnesses:
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HELEN F. LILLIS.