(No Model.) 2 Sheets—Sheet 1.

C. STEES & G. GRAUPENSPERGER.

WATER HEATER.

No. 481,211. Patented Aug. 23, 1892.

FIG. 1.

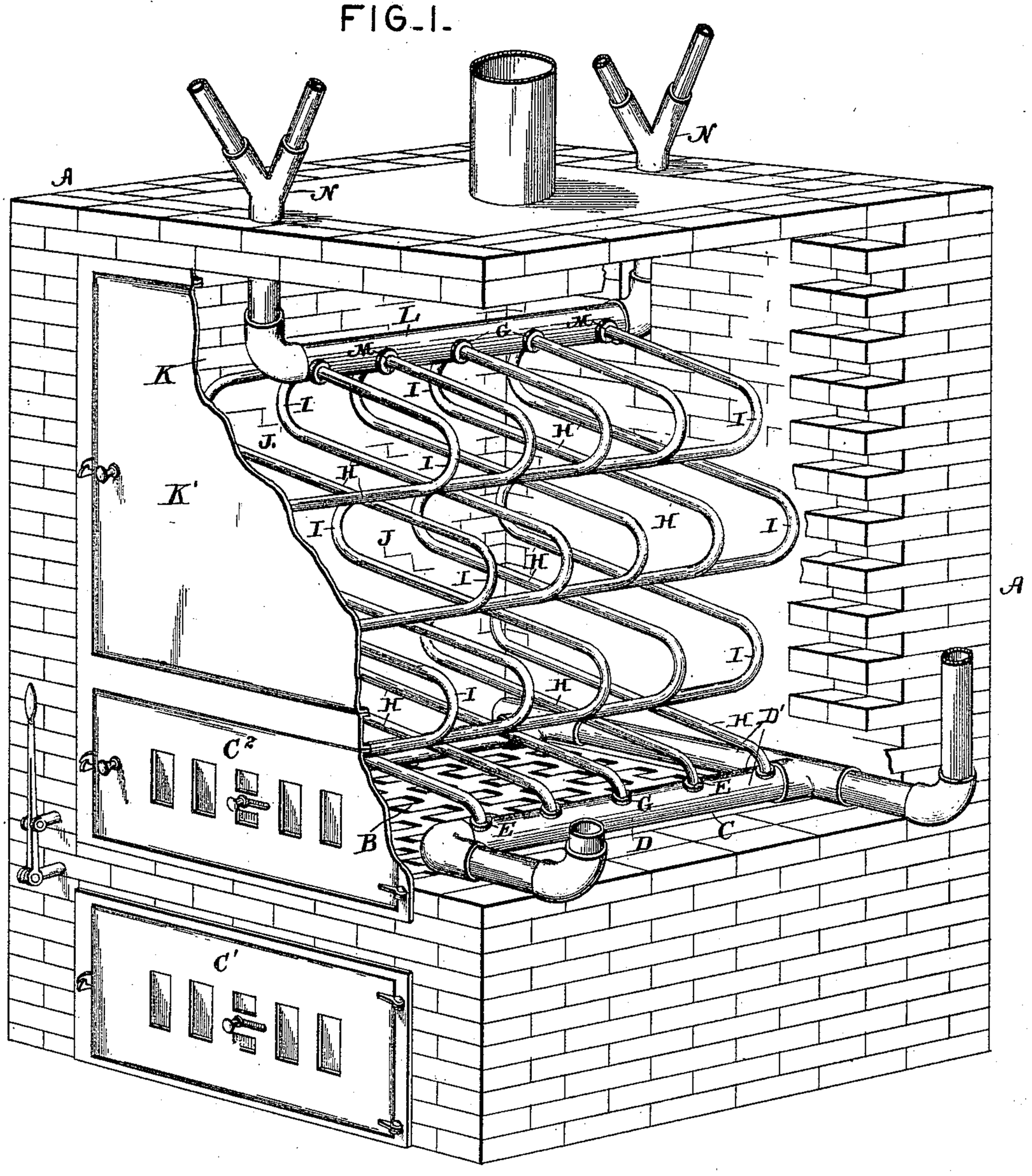
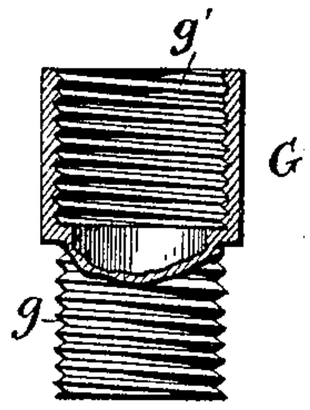


FIG. 4.



Witnesses

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(No Model.) 2 Sheets—Sheet 2.

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WATER HEATER.

No. 481,211. Patented Aug. 23, 1892.

FIG. 3.

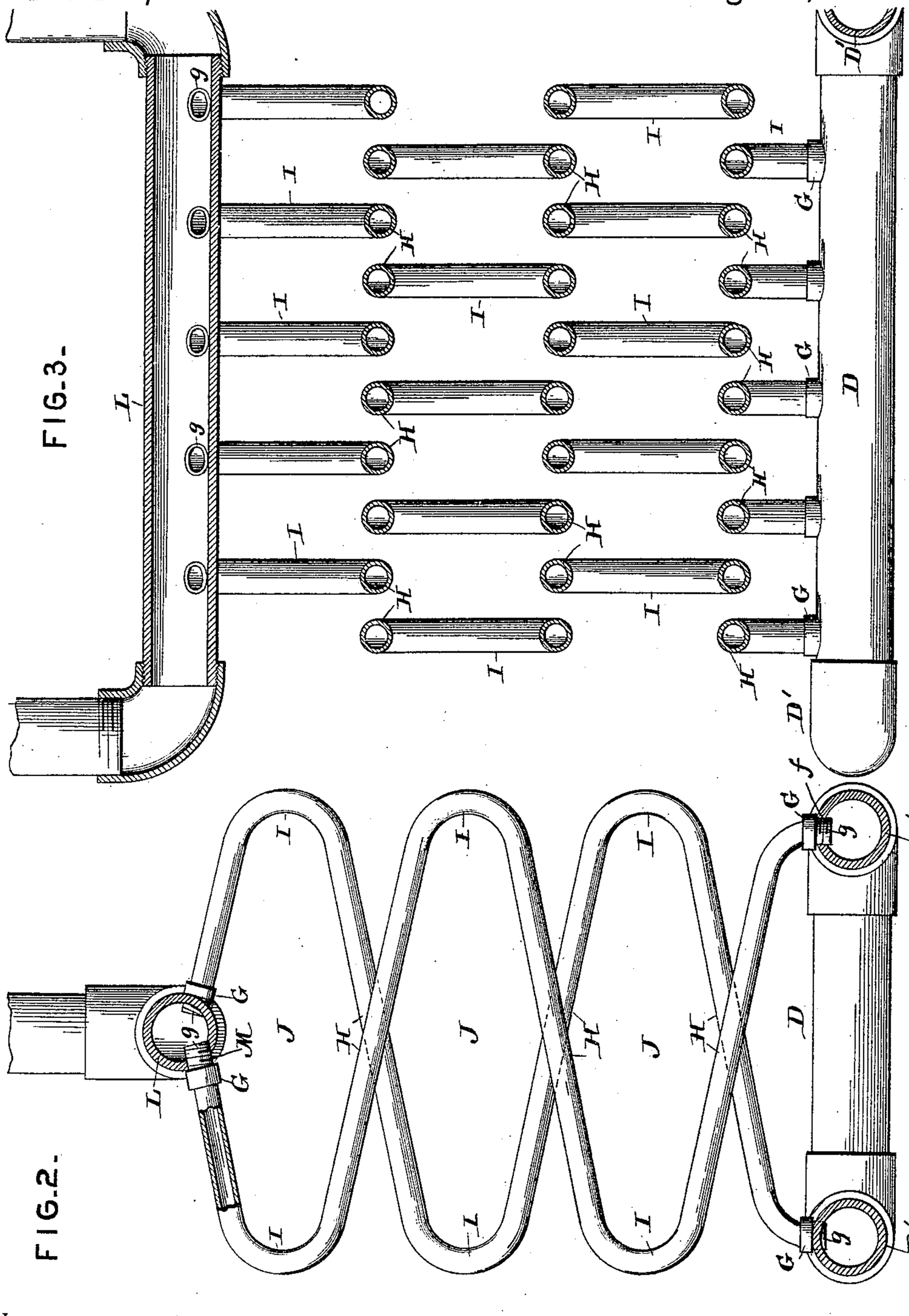

FIG. 2.

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UNITED STATES PATENT OFFICE.

CLARENCE STEES AND GEORGE GRAUPENSPERGER, OF ALTOONA, PENNSYLVANIA.

WATER-HEATER.

SPECIFICATION forming part of Letters Patent No. 481,211, dated August 23, 1892.

Application filed March 22, 1892. Serial No. 425,898. (No model.)

To all whom it may concern:

Be it known that we, CLARENCE STEES and GEORGE GRAUPENSPERGER, citizens of the United States, residing at Altoona, in the county of Blair and State of Pennsylvania, have invented a new and useful Water-Heater, of which the following is a specification.

This invention relates to hot-water heaters; and it has for its object to provide an improvement in devices of this character which not only simplifies and renders less expensive such apparatus, but at the same time by the construction thereof affords a materially increased heating area, and also further provides means whereby small quantities of water are exposed to the direct action of the heat, and the same is consequently heated much more rapidly and circulated in a more perfect manner than in the ordinary hot-water-heating apparatus ordinarily used.

The invention also contemplates improved facilities for cleaning the pipes of the heater, which necessarily become clogged with soot, &c., from the use of bituminous or soft fuel.

To this end the main object of the invention is to generally improve upon the construction of similar devices.

With these and other objects in view which will be quite apparent to those skilled in the art the invention consists in the novel construction, combination, and arrangement of parts hereinafter more fully described, illustrated, and claimed.

In the accompanying drawings, Figure 1 is a perspective view of a hot-water heater constructed in accordance with our invention, part of the furnace-casing being broken away to expose the interior construction. Fig. 2 is a vertical transverse sectional view of the heater, the inclosing furnace-casing being removed for the purposes of illustration. Fig. 3 is a vertical longitudinal sectional view of the same. Fig. 4 is a detail in perspective of one of the double-threaded bushings.

Referring to the accompanying drawings, A represents the inclosing furnace constructed in the ordinary manner and accommodating therein the fire-grate B, preferably constructed as illustrated and located directly over the ash-pit C, having the usual ash-pit door C′ below the grate, while above the grate and opening into the fire-box is the fire-door C^2, all of which parts are in ordinary furnaces.

Suitably supported within the inclosing furnace-walls and directly over the fire-grate B is the water-base D, comprising the connected piping D′, which are suitably connected with the flow and return pipes of the apparatus, which may be multipled according to the number of radiators in use. The said water-base is of an approximate rectangular shape and the opposite parallel pipes thereof are provided with threaded perforations F, which perforations receive the double-threaded bushings G. The said bushings are provided with exteriorly-threaded shanks *g*, taking into the threaded perforations of the water-base, and with the interiorly and reversely threaded flange-sockets *g′*, which receive the lower ends of the sinuous circulating-pipes H. It will of course be readily seen that by the use of the double and reversely threaded bushings while screwing said bushings into the base the same at the same time tighten the threaded ends of the circulating-pipes therein, while, on the other hand, by unscrewing the bushings from the base the said pipes are screwed out of the sockets, and therefore the parts dissembled when desired. The said sinuous circulating-pipes H are of a comparatively small diameter so that a greater number of the same may be employed for presenting a greater water-heating area to the fire, and also to provide means for presenting only small quantities of water to the heat in a single pipe. This naturally provides for rapidly heating the water, and thereby causing the same to rapidly and freely circulate. The said sinuous circulating-pipes H pass from the opposite parallel pipes of the rectangular base side by side with each other and directly over the fire-grate, said pipes extending entirely across the width of the furnace and intersecting centrally over the fire-grate to inclose the fire-box and form an interlaced crown-sheet composed of a network

of water-pipes, which receive the heat directly from the fire thereunder. The pipes H are bent upon themselves, as at I, at each side of the furnace and continue to sinuously pass from one side of the furnace to the other and intersecting centrally, as over the fire-chamber, to the top of the furnace, the said pipes by thus intersecting forming longitudinal cleaning-passages J, extending entirely through the same and providing means whereby ready access may be gained to every part of the network of pipes through said passages from the large cleaning-opening K in the front of the furnace and inclosed by the door K′. The open passages through the pipes also allows for a thorough diffusion of the heat throughout the entire apparatus, and allows the same to come into direct contact with the separate portions and bends of the same in their sinuous vertical disposition. The vertical sinuously-disposed pipes H, arising side by side with each other and reversely bent with respect to the adjacent pipe, are connected with the common distributing-pipe L, located at the top of the furnace centrally above the circulating-pipes, and also provided with a series of threaded openings M, which receive the securing-bushings G, similarly constructed to the bushings already-described, and receiving the extreme upper ends of said pipes.

Suitable Y or other connections N are connected to the opposite end connections of the upper distributing-pipe and provide means whereby connection may be readily made with the various radiators receiving and radiating the circulating hot water. The flow and return connections are made with the water-base in any suitable manner, as already observed.

The construction and operation of the herein-described heater are thought to be apparent without further description; but it is well to observe at this point that the sinuously-bent circulating-pipes are each composed of but one single and unbroken pipe from the base-pipe to the upper distributing-pipe and that the bends of the same at opposite sides of the furnace are made upon a gentle curve, which dispenses with the use of elbows, return-bends, or joints of any character, which must necessarily cause a great amount of friction and impede a free and uninterrupted circulation, which is necessary to an effective heater of this character. With respect to the water-base of the connected piping D′ it will of course be understood that a cast-iron rectangular hollow water-base would answer the intents of the present invention as well as the construction specifically described.

Having thus described our invention, what we claim, and desire to secure by Letters Patent, is—

1. The combination, with the furnace having an enlarged cleaning-opening, of the hollow rectangular water-base of connected piping supported directly over the fire-grate, an upper horizontal distributing-pipe, and a series of vertically-arranged sinuous unbroken circulating-pipes side by side with each other and removably connected to opposite side pipes of the hollow water-base and opposite sides of said distributing-pipe, said circulating-pipes being gently bent upon themselves at opposite sides of the furnace and passing to and from said opposite sides of the furnace to said distributing-pipe and intersecting centrally to form an interlaced pipe crown-sheet for the fire-box, and a series of longitudinal open passages communicated with said cleaning-opening, substantially as set forth.

2. In a device of the class described, the combination, with the water-base, and the distributing-pipe having threaded perforations, and the circulating-pipes having screw-threaded ends, of the hollow securing-bushings provided with exteriorly-threaded shanks engaging the threaded perforations of the water-base and distributing pipes, and interiorly and reversely threaded flanged sockets receiving the threaded ends of the circulating-pipes, substantially as set forth.

In testimony that we claim the foregoing as our own we have hereto affixed our signatures in the presence of two witnesses.

CLARENCE STEES.
GEO. GRAUPENSPERGER.

Witnesses:
JNO. H. SIGGERS,
BERNICE A. WOOD.