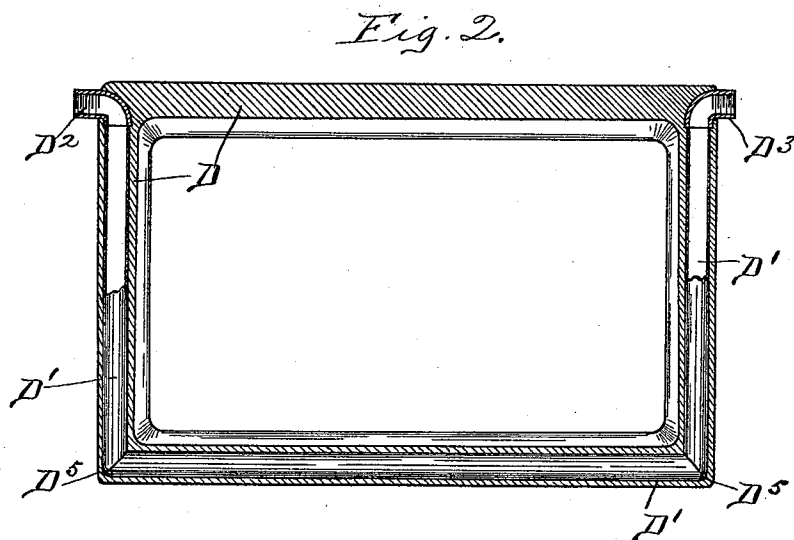
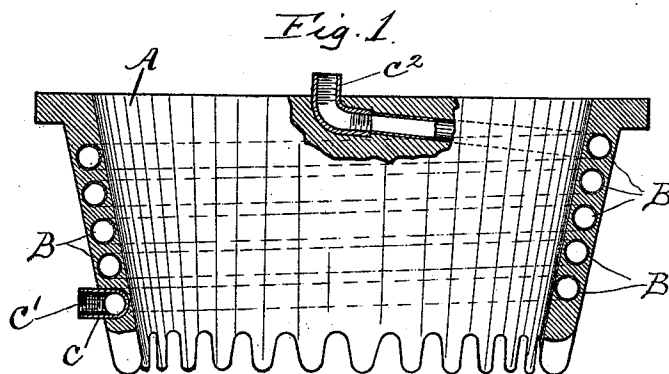


R. H. STUBBS.
HEATING APPARATUS.

No. 518,798.

Patented Apr. 24, 1894.



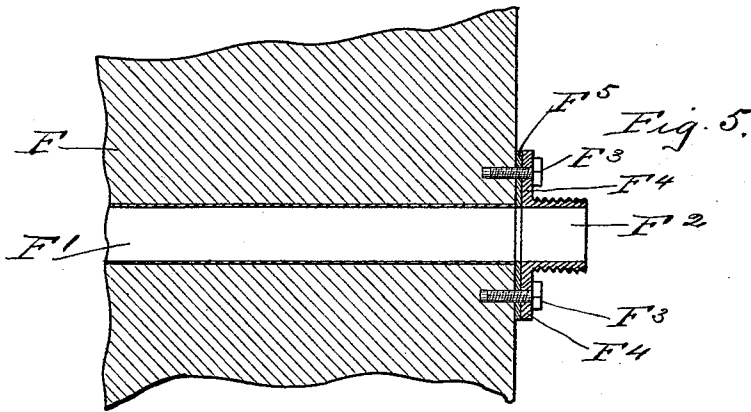
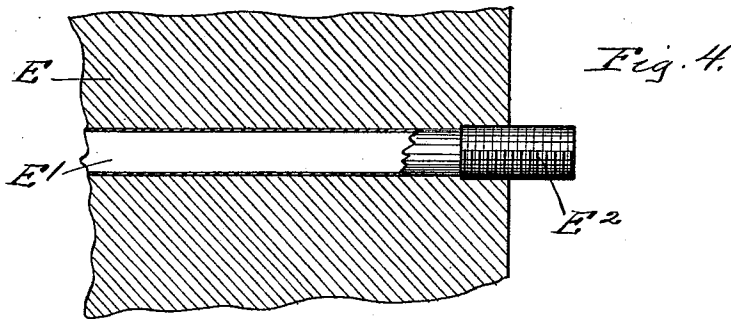
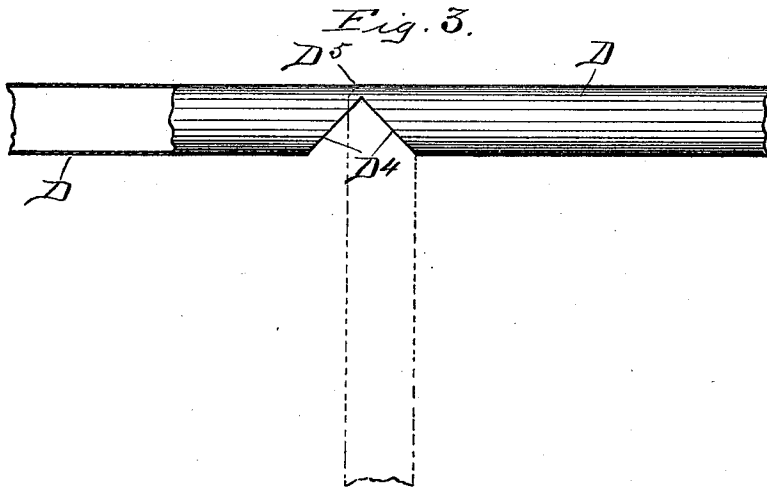
Witnesses:
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B. M. Hale

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by Mosher & Curtis
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UNITED STATES PATENT OFFICE.

ROLAND H. STUBBS, OF WATERFORD, NEW YORK.

HEATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 518,798, dated April 24, 1894.

Application filed December 7, 1893. Serial No. 493,003. (No model.)

To all whom it may concern:

Be it known that I, ROLAND H. STUBBS, a citizen of the United States, residing at Waterford, county of Saratoga, and State of New York, have invented certain new and useful Improvements in Heating Apparatus, of which the following is a specification.

My invention relates to such improvements and consists of the novel construction and combination of parts hereinafter described and subsequently claimed.

Reference may be had to the accompanying drawings, and the letters of reference marked thereon, which form a part of this specification.

Similar letters refer to similar parts in the several figures therein.

The object of my invention is to provide a metal casting with a water or steam passage therethrough by casting the metal around a thin pipe which forms a permanent hollow core and securing inlet and outlet coupling-sections directly to the casting in communication with the respective terminals of the core-pipe. A cast-metal wall having a passage therethrough with convenient means for coupling water or steam-pipes in communication with its terminals has various uses, among them that of a water-heating and circulating device, when the casting has a fire-surface. Various attempts have been heretofore made to provide a casting with such a passage and connections, by using a sand or other destructible core, which is expensive and uncertain in results, and by inclosing a metal pipe in the casting with its ends projecting therefrom and coupling the inlet and outlet pipes upon such projecting ends. In pursuing the latter method, it was necessary that the inclosed pipe should be sufficiently heavy and strong to permit of coupling the connecting pipes thereto, and the use of a thick and heavy pipe, made necessary by these requirements, added largely to the expense of manufacture and required so thick a wall to inclose the pipe that the casting was unavailable for general use, due to its great weight and bulk. In my improved construction, I use as a core, a flexible pipe of sufficient strength to withstand the casting operation, but too thin to form a support for coupling mechanism, and cast around the same a metal

wall of the desired form, and secure coupling-sections of suitable strength and thickness directly to the casting in communication with the respective terminals of the thin core-pipe, which is allowed to remain in the casting.

The advantages derived from the use of a relatively thin core-pipe are many. Such pipe is less expensive than heavier and stronger pipe, and is more easily bent and made to assume the desired form in the mold preparatory to casting the metal around the core. The thinness of the core-pipe wall also enables me to bring the contents of such pipe, in use, nearer the heated surface, when the casting forms a fire-wall.

Figure 1 of the drawings is a view in central vertical section of a circular fire-pot embodying my invention, and adapted for use as a water-heating-and-circulating device in a common form of heating stove. Fig. 2 is a horizontal section of a rectangular form of fire-pot made after my invention. Fig. 3 is a view of a piece of thin core-pipe, illustrating the method of making a joint at a bend in the same. Figs. 4 and 5 are sectional views showing modified forms of coupling-section.

Referring to Fig. 1, which shows my invention adapted for use in a heating stove, A— is a cast-metal fire-pot, circular in form; and B— is a thin flexible pipe bent to form an ascending coil conforming in curvature to the wall of the fire-pot. The coil is wholly inclosed by the fire-pot wall which is cast upon and around the thin pipe while the same is supported like a core in the mold. C— is a coupling-section formed of a short section of strong, heavy pipe having coupling-threads C'— on one end and its other end secured directly to the casting in communication with the inlet terminal of the core-pipe, the fire-pot wall being cast upon and around the coupling-section while the same is supported in the mold in communication with the terminal of the core-pipe. C²— is a coupling-section in the form of an elbow, similarly inclosed by and secured directly to the casting in communication with the exit terminal of the core-pipe.

In Fig. 2 I have shown a rectangular fire-pot D— having its walls cast upon and around the thin core-pipe D'— which extends lon-

gitudinally of the front and both end-walls of
 the fire-pot. The coupling-sections D^2 — and
 D^3 — are in the form of elbows and are se-
 cured directly to the casting in communica-
 5 tion with the respective terminals of the core-
 pipe in the same manner as those shown in
 Fig. 1. A fire-pot constructed as above de-
 scribed can be cheaply made and easily ap-
 10 plied to known forms of heating apparatus;
 and, in connection with a radiator or hot-wa-
 ter reservoir, can be used for steam or hot-
 water heating purposes. In bending the thin
 core-pipe to the form shown in Fig. 2, I cut
 away a triangular portion of the pipe, as
 15 shown at D^4 — in Fig. 3, leaving only a nar-
 row wall D^5 — connecting the pipe-sections
 on opposite sides of the cut portion. I then
 bend one of such sections from the position
 20 shown by solid lines to that indicated by
 dotted lines in the latter figure, whereby the
 several edges of the pipe-sections are brought
 into contact and the direction of the pipe
 is changed without the use of couplings and
 without diminishing the size of the passage-
 25 way therethrough. By leaving an unsevered
 portion D^5 — of the pipe-wall at such joint,
 the core formed by the angularly-arranged
 pipe-sections, is made self-supporting in the
 mold, and disarrangement of the parts pre-
 30 vented. The core-pipe can be made of any
 kind of sheet, or other form of, metal that will
 withstand the casting operation, and may be
 of any desired cross-sectional form. No great
 care is necessary in joining the longitudinal
 35 edges of a seamed pipe, or in forming connec-
 tions between parts to be inclosed by the cast-
 ing, such as the joints formed at the bends in
 the core-pipe shown in Fig. 2, it only being
 necessary to cover the joints and seams in any
 40 known manner, as with core-sand or other
 composition, to prevent the entrance of the
 molten metal therethrough in the casting op-
 eration, the inclosing metal, when set, com-
 pleting and protecting the joints. The core-
 45 pipe being wholly inclosed by the casting, is
 supported and strengthened by the inclosing

cast-metal to withstand internal steam or wa-
 ter pressure; and should any portion of the
 core-pipe be, or become, defective, the inclos-
 ing cast-metal would cover and correct such
 50 defect. The coupling-sections can be made
 of any known form or material, preferably of
 wrought-metal pipe; and may be secured di-
 rectly to the casting in any known manner.

In Fig. 4, I have shown a metal wall E — cast
 55 around the thin core-pipe E' —. The coup-
 ling-section E^2 — is screw-threaded exteriorly,
 and the wall may be cast around its inner end,
 or the same may be screwed into a threaded
 socket in the casting.

In Fig. 5, the wall F — is cast around the
 thin core-pipe F' ; and the coupling-section
 F^2 — is bolted to the casting by means of the
 screw-bolts F^3 — passing through a flange F^4 —
 on the coupling-section, and inserted in the
 60 casting. A washer F^5 — may be inserted be-
 tween the coupling-section and the casting,
 when desired.

What I claim as new, and desire to secure
 by Letters Patent, is—

1. The combination with a relatively thin
 flexible pipe, and a metal wall cast around the
 same, of relatively thick coupling-sections se-
 cured directly to the casting in communica-
 75 tion with the respective terminals of the pipe,
 substantially as described.

2. In a fire-pot for heating apparatus, the
 combination with a relatively thin flexible
 pipe, and relatively thick coupling-sections
 severally contiguous to and communicating
 80 with the respective pipe-terminals, of a fire-
 wall cast upon and around the pipe and the
 contiguous communicating ends of the pipe
 and coupling-sections, substantially as de-
 scribed.

In testimony whereof I have hereunto set
 my hand this 5th day of December, 1893.

ROLAND H. STUBBS.

Witnesses:

FRANK C. CURTIS,
A. E. DELANEY.