

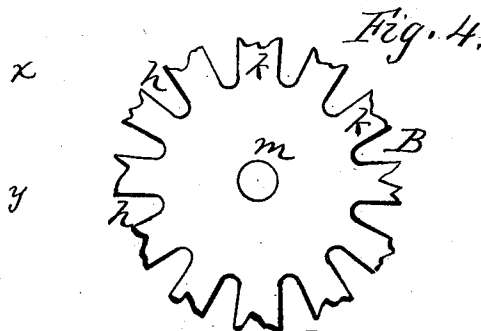
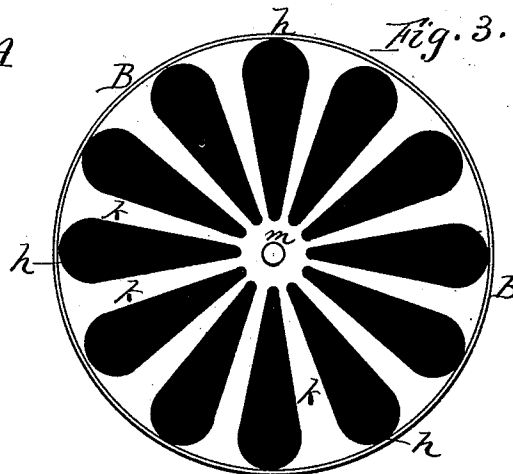
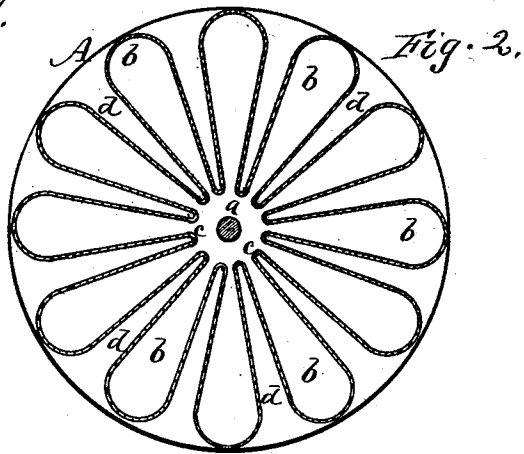
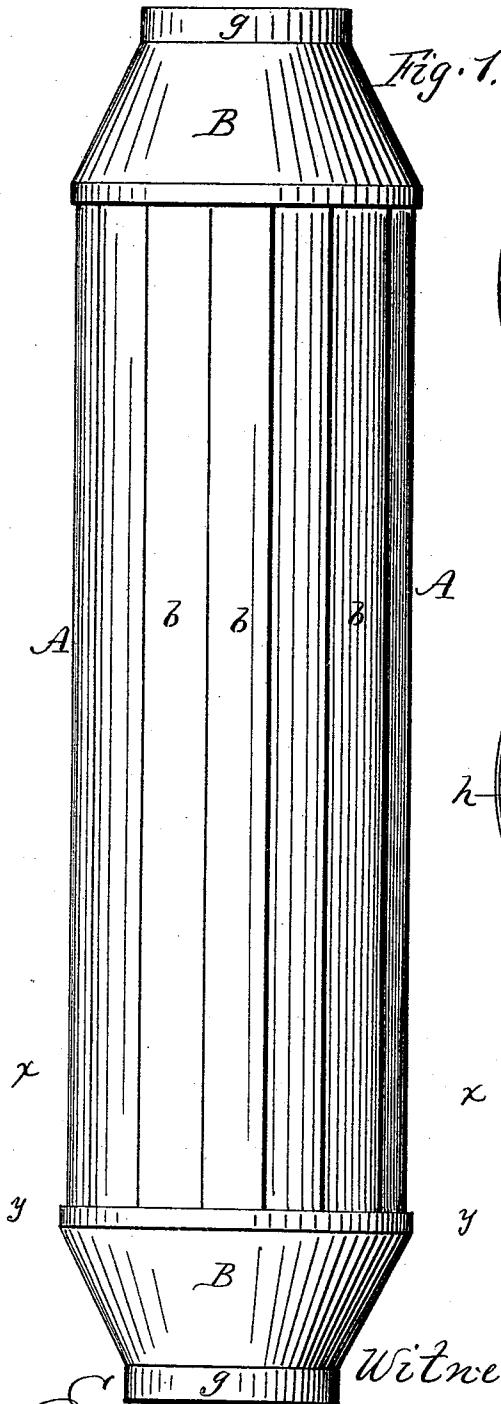
(No Model.)

2 Sheets—Sheet 1.

E. R. McCALL.
HEATING PIPE AND RADIATOR.

No. 495,358.

Patented Apr. 11, 1893.



Witnesses.
E. K. Adams
Chas. Q. Widener

Inventor.
Edwin R. McCall
by *R. F. Osgood*
Atty

(No Model.)

2 Sheets—Sheet 2.

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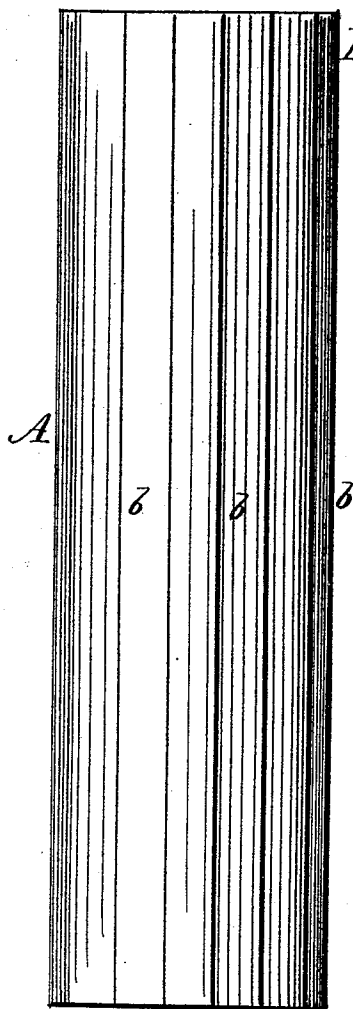


Fig. 5.

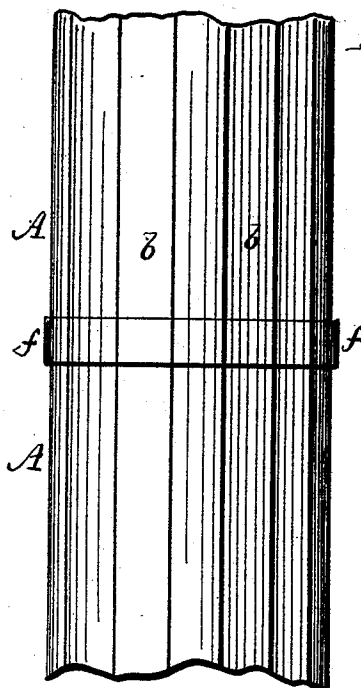
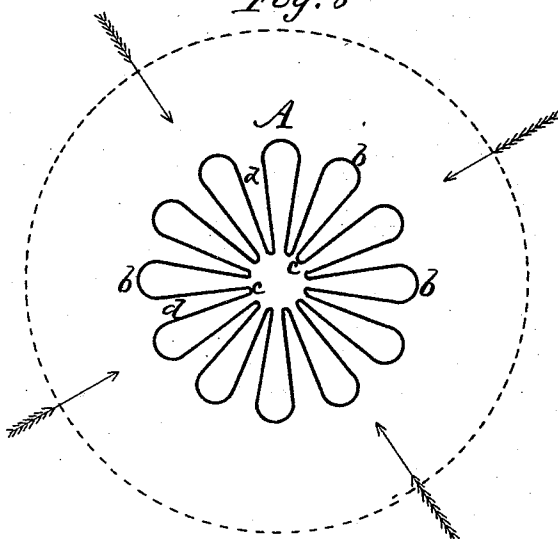
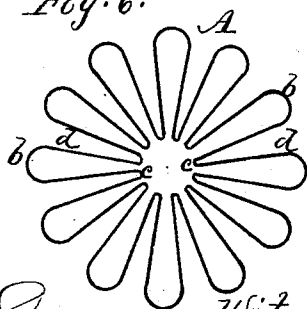


Fig. 7.

Fig. 8

Fig. 6.



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UNITED STATES PATENT OFFICE.

EDWIN R. McCALL, OF ROCHESTER, NEW YORK.

HEATING PIPE AND RADIATOR.

SPECIFICATION forming part of Letters Patent No. 495,358, dated April 11, 1893.

Application filed July 5, 1889. Renewed September 15, 1892. Serial No. 446,019. (No model.)

To all whom it may concern:

Be it known that I, EDWIN R. McCALL, of Rochester, in the county of Monroe and State of New York, have invented a certain new and useful Improvement in Heating Pipes and Radiators; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the drawings accompanying this specification.

My improvement relates to heating pipes for radiators and other purposes, and the design is to make from a plain sheet or cylinder of iron a pipe arranged in folds, with air channels between the folds which shall present a great amount of radiating surface in a compact space.

To this end my invention consists in the following construction and arrangement.

In the drawings—Figure 1 is an elevation of a radiator showing my invention. Fig. 2 is an enlarged cross section of the same in line *xx* of Fig. 1. Fig. 3 is a plan view of the lower head of the radiator, looking downward from line *yy* of Fig. 1. Fig. 4 is an enlarged plan view of the central bearing portion of the head. Fig. 5 is an elevation of the corrugated pipe. Fig. 6 is an end view of Fig. 5. Fig. 7 is an elevation showing the meeting ends of two sections of the pipe and a joint piece connecting them. Fig. 8 is a diagram illustrating the method of corrugating the pipe.

This invention relates to corrugated sheet metal pipes. The cylinders have before been corrugated, but the corrugations are usually of small size and present only a waved surface with shallow grooves. In my invention the cylinder is deeply corrugated, the inner ends of the corrugations being carried nearly to the center, and the outer ends being made of much larger diameter than the inner ones, by which means a great amount of radiating surface is presented.

A indicates a section of the pipe, which is made of sheet metal and of any desired diameter and length. A straight rectangular length of sheet metal is provided, which is then bent around into cylindrical form, and the edges seamed or otherwise joined, the same being indicated by the large exterior circle shown in Fig. 8. By suitable mechanical appliances this cylinder is struck or

bent in, forming a series of corrugations, as indicated by the interior circle in Fig. 8. The great amount of surface taken up by these corrugations makes the inner drum of small size comparatively. An exterior cylinder of forty inches diameter will produce an interior cylinder of only about ten inches diameter. Therefore it will be seen that a very great extent of radiating surface is reduced to a very compact space. The corrugations are not corrugations as used in the ordinary sense in heating apparatus, but are rather double folds carried nearly to the center of the drum, leaving only space for the proper central passage of heat, and, when connected with the heads of a radiator, leaving space for the central bearing of the head, and a rod *a* that passes through to bind the heads to the pipe. The exterior ends *b* of the corrugations are of much larger diameter than the inner ends *c*, leaving thereby passages *d d* between the corrugations that do not greatly vary in width at any point in their length. The heat and products of combustion pass up the interior of the pipe, while the cold air passes up through the passages *d d* between the corrugations, and therefore receives the benefit of the radiation on two opposite sides and in a thin sheet. The enlarged outer ends of the corrugations cause the heat to ascend in a great degree in the outer part of the radiator thus equalizing the action through the whole interior, by which the radiation is promoted. In case the pipe is put up in sections as stove pipe, the ends can be joined directly as in common stove pipe, or joint pieces *f* (Fig. 7) may be used to connect them. Cylinders made in this way can be used on stoves and furnaces and other heating apparatus.

Figs. 1, 2, 3, 4, show a radiator and its parts, in which case the pipe *A* is located between two hollow heads *B B*, which are contracted at their outer ends, forming collars *g g*, which connect with ordinary stove pipe. Openings or ports *h h* are made in the flat inner ends of the heads, over which the corrugations of the pipe rest, and solid bars *k k* are left between the openings, and a solid center *m* is also left, through which passes the rod *a*. The heat ascends from the lower length of stove pipe through the interior of the radiator, while the exterior air passes over the bottom head *B*,

enters the passages *d d*, and ascends to the top, and passes out again under the upper head B.

Having described my invention I do not claim a corrugated pipe; neither do I claim
5 broadly corrugated sections fitted to be joined at the ends; neither do I claim broadly heads at the ends of the sections adapted to be fitted to the ends of common stove pipe.

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

1. A pipe section made in folds of larger diameter at the outer than at the inner folds, and with approximately parallel sides, said
15 folds extending nearly to the center of the pipe and forming thin and broad channels for the upward passage of air outside the pipe, as herein shown and described.

2. A pipe section made in folds of larger diameter at the outer than at the inner folds, and with approximately parallel sides, said
20 folds extending nearly to the center of the pipe and forming thin and broad channels for the upward passage of air outside the pipe, and hollow heads at the ends of the pipe covering the folds and contracted at their ex-
25 tremities to fit the ends of common stove pipe, as herein shown and described.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

EDWIN R. MCCALL.

Witnesses:

R. F. OSGOOD,

WM. J. MCPHERSON.