(Model.)

J. A. REED.

COMPRESSIBLE CAST METAL PIPE.

No. 249,547. Patented Nov. 15, 1881.

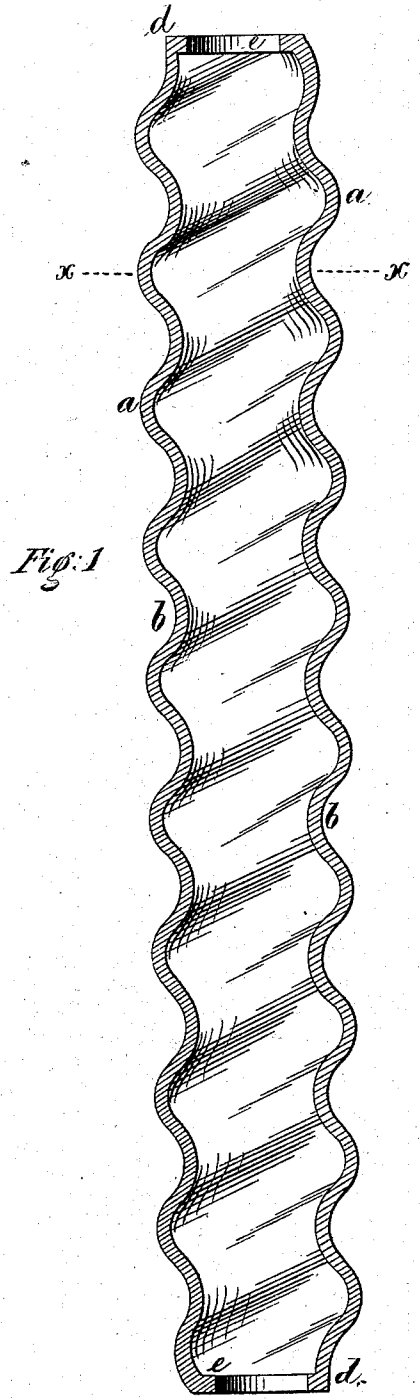


Fig: 1

Fig: 2.

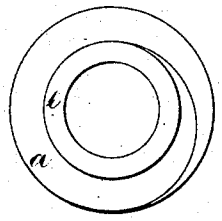
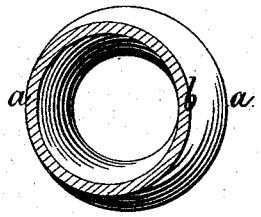


Fig: 3.



Witnesses
Harold Serrell
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UNITED STATES PATENT OFFICE.

JOHN A. REED, OF NEW YORK, N. Y.

COMPRESSIBLE CAST-METAL PIPE.

SPECIFICATION forming part of Letters Patent No. 249,547, dated November 15, 1881.

Application filed June 24, 1881. (Model.)

To all whom it may concern:

Be it known that I, JOHN A. REED, of the city and State of New York, (formerly of Dunellen, in the State of New Jersey,) have invented an Improvement in Compressible Cast-Metal Pipes, of which the following is a specification.

Cast-metal tubes for boilers have been made with alternate bulges and contractions, the section of the same being composed of segments of circles standing in reverse positions. A tube of this character is represented in Letters Patent No. 192,389 granted to me.

In my present invention the pipe is an ogee helix or spiral with circular ends, and the same is especially adapted to the cast-iron flues or water-tubes in furnaces, but the same may be placed at intervals in steam, gas, or water pipes or mains to allow for expansion and contraction without injury to the tubes or joints.

In the drawings, Figure 1 is a longitudinal section of this tube. Fig. 2 is a cross-section at the line *x x*, and Fig. 3 is an end view.

The section of each side of the tube is an undulating line or series of ogee curves, one standing in one direction and the other in the other direction. The convex curves are marked *a* and the concave curves are marked *b*, and they are of equal or nearly equal radius. The tube has a configuration that would result from the revolution of the convex and concave curves *a b* around the axis of the tube, at the same time that an end motion is given sufficient to produce a screw form.

In order to obtain a pipe that is reliable under the various changes of temperature and compression, I make the pitch-line of the screw about two-thirds the diameter of the tube and the depth of the depression (forming the helical groove around the pipe) about one-quarter of the diameter of the pipe, so as to obtain the requisites of strength and lightness. This tube can be compressed endwise to a considerable extent without injury, although made of cast-iron, and the ordinary expansion and contraction can take place without injury to the tube or to the joints by which the tube is connected; hence this tube is adapted to the flues of boilers to contain water with the heat outside the tube, to use in water, gas, or steam mains or pipes, to allow of expansion or contraction, and to other uses where a compressible cast-iron tube can be employed. At the ends of the tube the spiral terminates in a partial cylinder at *d* that forms a circular end to the tube, and has the axis of the tube for the center, otherwise the end of the tube would open at one side, as indicated by the section, Fig. 3; and to strengthen the end there is either an outward or an inward flange, *e*.

I am aware that screw-shaped tubes have been made, but the convex and concave curves are not equal, and hence the strain resulting from compression is not equal on all parts of the metal. Flanges have also been employed at the ends of the tubes, and cylindrical ends to the screw-shaped tubes have also been proposed. In my improvement the cylindrical ends are contracted so as to be smaller than the screw-shaped portion, and the extreme ends are flanged or thickened, the object of this being to allow of the necessary strength of metal between one opening and the next in the tube-sheets, against which the ends of the screw-shaped tubes are received, and at the same time the screw-shaped tubes can be arranged moderately close together, so as to get the maximum number of tubes into a given space.

I claim as my invention—

The cast-metal tube the body of which is an ogee helix, the convex and concave curves being equal, or nearly so, and the ends of the tube circular, of flanged or thicker metal, and smaller than the screw portion, but having the same axis, substantially as set forth.

Signed by me this 24th day of March, A. D. 1879.

JOHN A. REED.

Witnesses:
GEO. T. PINCKNEY,
HAROLD SERRELL.