(No Model.)

# C. A. McALLISTER.

## CIRCULATOR FOR BOILER FURNACES.

No. 454,140. Patented June 16, 1891.

*Fig. 1.*

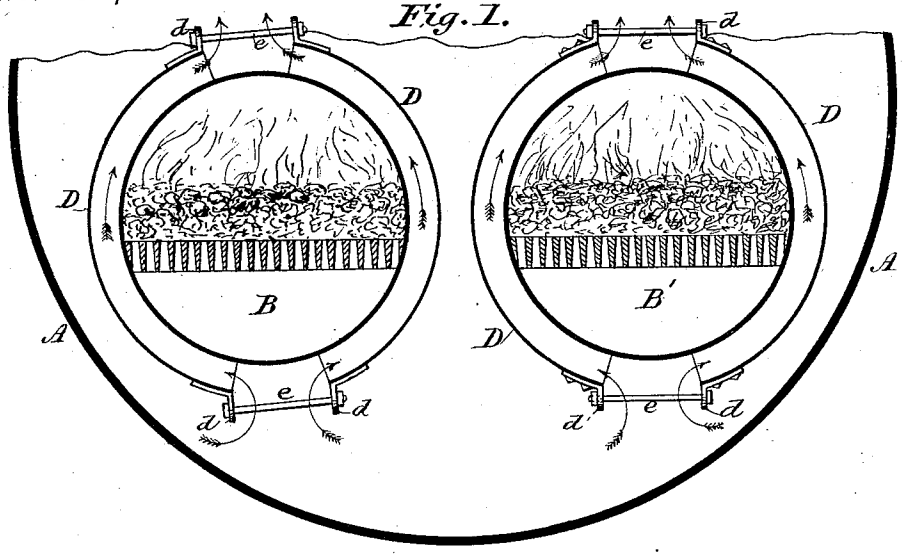



*Fig. 2.*

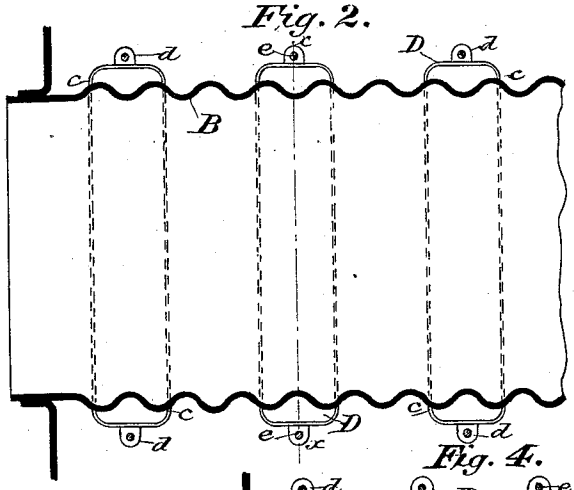



*Fig. 3.*

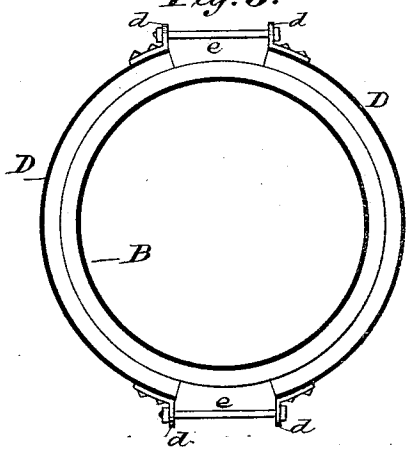
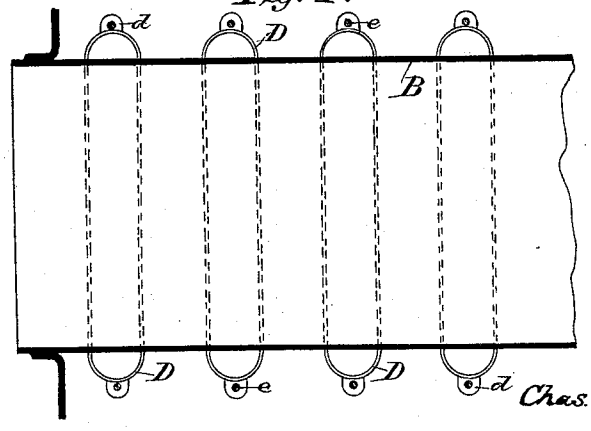



*Fig. 4.*




Witnesses:
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# UNITED STATES PATENT OFFICE.

CHARLES A. McALLISTER, OF CITY ISLAND, NEW YORK.

## CIRCULATOR FOR BOILER-FURNACES.

SPECIFICATION forming part of Letters Patent No. 454,140, dated June 16, 1891.

Application filed October 14, 1890. Serial No. 368,071. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES A. McALLISTER, a citizen of the United States, residing at City Island, in the county of Westchester and State of New York, have invented a new and useful Circulator for Boiler-Furnaces, of which the following is a specification.

My invention relates to improvements in circulators for furnaces of boilers; and the object of the invention is to produce a device for creating a better circulation of the water around the furnaces of boilers, as it is well known to engineers and others skilled in the art that the furnaces, as well as the shell of boilers, often crack or become ruptured by their uneven contraction and expansion, caused by the differences in temperatures of the water.

Another object is to produce a circulating device that can be readily adjusted and applied to old as well as new furnaces; also, to prevent the formation of scale on the furnaces, and the accumulation of sediment between the furnaces and boiler-shell; furthermore, to materially increase the heating-surfaces of the furnaces by conducting the heat imparted from the furnace to the circulating-plates and to the water, and, finally, to produce a very cheap device which is not liable to get out of order.

With these objects in view my invention consists in the construction of certain details and arrangements of parts, as will be more fully described hereinafter, and specifically pointed out in the claims, reference being had to the accompanying drawings, and letters of reference marked thereon.

Like letters indicate similar parts in the different figures of the drawings, in which—

Figure 1 represents a sectional elevation of the lower part of a boiler, showing my circulators in position. Fig. 2 is a longitudinal section of a part of a corrugated furnace with the circulators applied. Fig. 3 is a cross-section of Fig. 2 on line $x$ $x$. Fig. 4 is a longitudinal section of a part of a plain furnace with the circulators in position.

In the drawings, A represents the lower part of a boiler of any suitable size and construction and having two furnaces B, and B′ arranged in the ordinary manner. One, two, three, or more furnaces can of course be employed, as desired. To the outer surface of these furnaces the circulators D are applied and as many as desired. These circulators consist of semicircular plates extending around each side of the furnaces nearly the entire circumference of said furnaces. On each side of these circulator-plates a lug $d$ $d$ is firmly riveted or otherwise secured, so as to face each other. Through these lugs a bolt $e$ is passed and provided with a nut and serves to secure the circulator-plates in position on the furnaces. These circulators may be made of any desired width, and as many as are deemed necessary may be applied to the furnaces.

In the modification shown in Figs. 2 and 3 a corrugated furnace is represented, and in this case the circulators may be made with flat surfaces and the sides or edges flanged or curved, as shown at $c$ in Fig. 2, so as to form a space for the circulation of the water between the furnaces and the plates. The lugs and bolts are in this instance the same as in the other figures.

These circulators are preferably made of sufficient width to extend a little more than over two corrugations, so that the sides that are turned down prevent any sidewise movement of said circulating-plates. They can be made of any desired thickness and of any suitable material.

The operation is as follows: The circulators having been applied to the furnaces and the water being filled to a proper level in the boiler, the fires are started on the grate. The water, as is well known, is coldest in the lower part of the boiler, will then enter at the lower end of the circulators, as indicated by the arrows, and ascending will pass out at the upper part, thus causing a violent and constant circulation of the water from the lower to the upper part of the boiler. The heat applied to the interior of the furnace will be imparted to the curved edges of the circulators, where they rest upon the furnaces, and passing along the width of said circulators will impart their heat to the water, thus materially increasing the heating-surface.

I am aware of the English Patents No. 725 of 1868 and No. 594 of 1888, as well as the French Patents Nos. 8,620 and 78,268 of 1867, and disclaim the construction therein shown; but,

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

1. The combination of a furnace with the adjustable circulator D, consisting of two semicircular parts having transversely-flanged edges adapted to rest on the boiler-flue, each part provided with lugs *d* for the bolts *e*, all constructed and arranged as shown and specified.

2. The combination, with a boiler-furnace, of two or more adjustable circulators D, consisting of two parts nearly surrounding said furnace and each part provided with lugs *d* and bolts *e* for adjusting them in position and having the transversely-flanged edges adapted to rest on the boiler-flue to form channels and conductors of heat, all substantially as shown and set forth.

3. The combination of a boiler-furnace with two or more adjustable circulators provided with flanges *c*, placed in contact with the outer circumference of the furnace, forming channels for the water and conductors of heat, and said circulators adjusted by lugs *d* and bolts *e*, all as herein specified.

In testimony whereof I hereby affix my signature in presence of two witnesses.

CHARLES A. McALLISTER.

Witnesses:

L. H. HENRY,

T. C. BRECHT.