

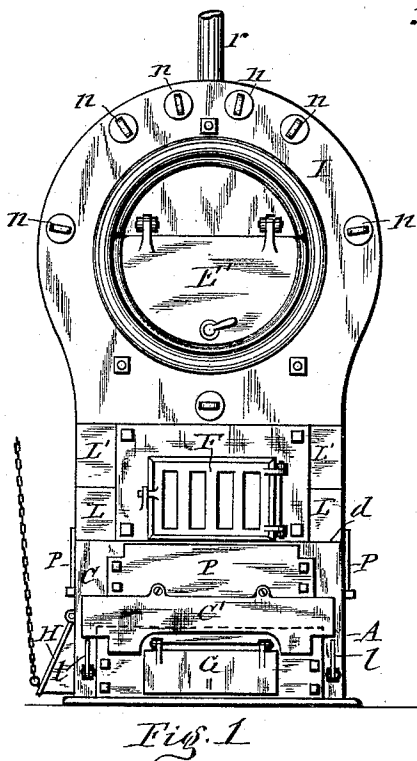
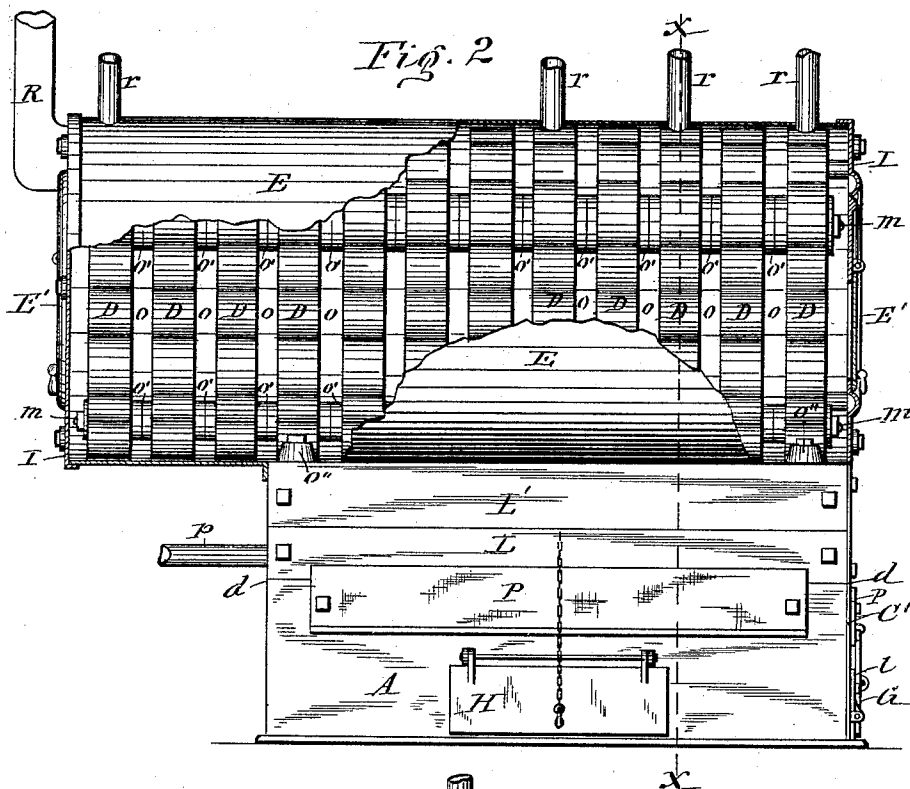
(No Model.)

2 Sheets—Sheet 1.

A. CATCHPOLE.
STEAM AND HOT WATER BOILER.

No. 466,770.

Patented Jan. 12, 1892.



WITNESSES:

C. L. Bendixon

Mark W. Dewey

INVENTOR:

Alfred Catchpole

BY

Smith, Lassar & Dunn
his ATTORNEYS

(No Model.)

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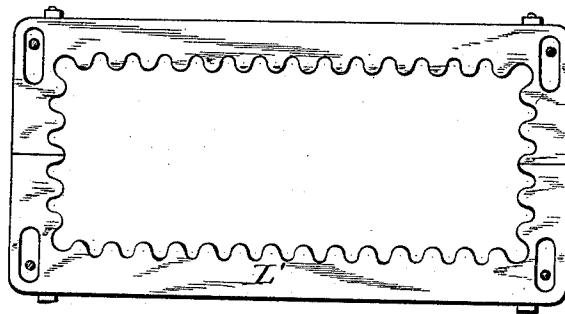


Fig. 6

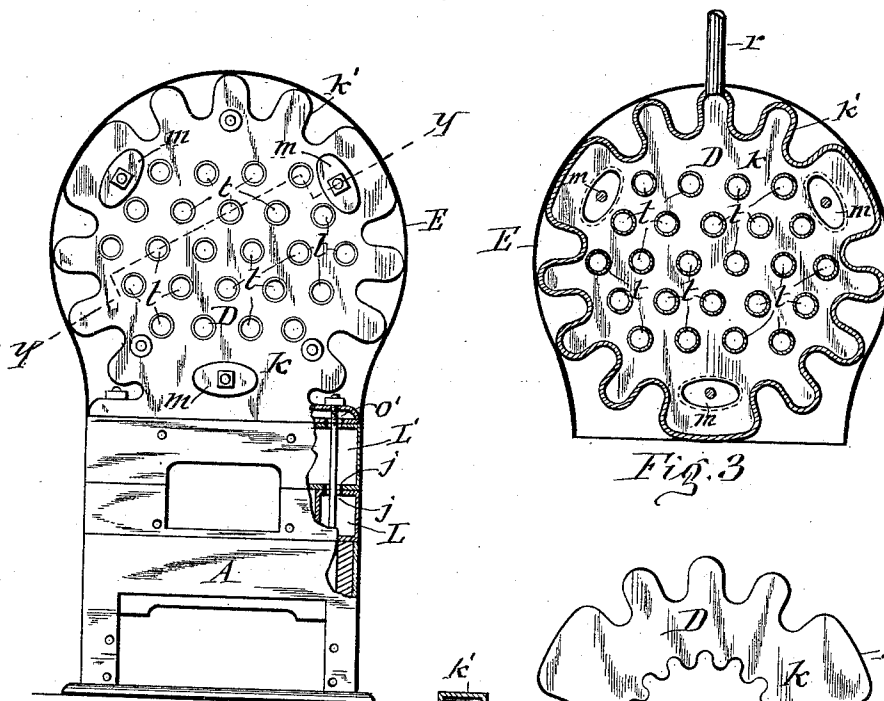


Fig. 4

Fig. 3

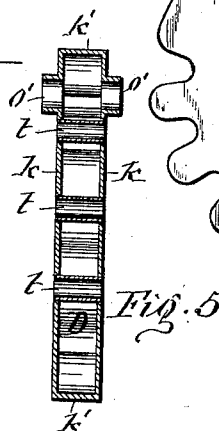


Fig. 5

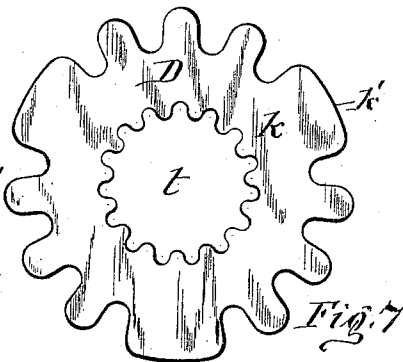


Fig. 7

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UNITED STATES PATENT OFFICE.

ALFRED CATCHPOLE, OF GENEVA, NEW YORK.

STEAM AND HOT-WATER BOILER.

SPECIFICATION forming part of Letters Patent No. 466,770, dated January 12, 1892.

Application filed October 4, 1890, Serial No. 367,062. (No model.)

To all whom it may concern:

Be it known that I, ALFRED CATCHPOLE, of Geneva, in the county of Ontario, in the State of New York, have invented new and useful Improvements in Steam and Hot-Water Boilers, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention consists in a novel construction of a hot-water or steam boiler composed of sections detachably connected, so that said boiler can be taken apart for repairs or renewal of some of its parts, and can also be extended in length when desired, and which boiler possesses a great amount of heating-surfaces, which are exposed to the impingement of the products of combustion in a most effective manner, and possesses many other advantages over other boilers, which will be readily perceived and appreciated by persons familiar with the construction and operation of the various boilers at present in use; and the invention furthermore consists in certain peculiarities of the details of its construction, all as hereinafter fully described, and set forth in the claims.

In the annexed drawings, Figure 1 is a front elevation of a boiler embodying my improvements. Fig. 2 is a side elevation of the same, with portions of the jacket or shell of the combustion-chamber broken away to illustrate the internal arrangements of the boiler. Fig. 3 is a vertical transverse section of the boiler proper on line *x x*, Fig. 2. Fig. 4 is a front end view of the boiler with the front plates removed and portions broken away, showing the water connections. Fig. 5 is a transverse section on line *y y*, Fig. 4. Fig. 6 is a detached plan view of the water-leg which forms the top portion of the fire-box, and Fig. 7 is a face view of a modification of the form of the boiler.

Similar letters of reference indicate corresponding parts.

A represents the base of the boiler, consisting of a cast-iron frame, preferably of rectangular form in its horizontal plane and disposed lengthwise of the boiler, the lower and main portion of said base constituting the ash-pit and the top portion of said base forming the lower portion of the fire-box.

The main portion of the fire-box consists

of water-legs *L L'*, superposed one upon the other, and are provided in their adjacent sides with coinciding ports *J J*, as shown in Fig. 4 of the drawings, through which ports the water can pass from one to the other of said water-legs, and thus permit proper circulation of the water.

Upon the water-leg *L'*, I mount a plurality of water-compartments or hollow boiler-sections *D D D*, each of which consists of two vertical plates *K K* and a peripheral plate *k'*, uniting said vertical plates, as illustrated in Fig. 5 of the drawings. These water-compartments are placed vertically side by side with spaces *o o* between them and extend across the top of the fire-box, said spaces forming radial passages for the products of combustion through the boiler. The successive water-compartments communicate with each other by water connections *o' o'*, consisting of coinciding ports in their adjacent sides and joined to each other thereat by rods *m*, passing through the series of water-compartments and their aforesaid water connections. They also communicate by similar water connections with the water-leg *L'*, as shown at *o''* in Fig. 4 of the drawings, and thus circulation of water is permitted through the series of water-compartments *D D D* and to and from the water-legs *L L'*. Any suitable number of water-compartments or boiler-sections *D* may be added to extend the boiler beyond the end of the fire-box. The compartments *D D D*, I preferably make annular-shaped and inclose the same by a horizontal cylindrical shell *E*, which forms the combustion-chamber, having the aforesaid water-compartments extending across the interior thereof. To increase the heating-surfaces of the water-compartment or boiler-sections *D D D*, I corrugate the peripheral plates *k'* at right angles to the vertical plates *k k*. The indentations of the corrugations with the shell *E* over them form longitudinal fire-flues on the exterior of the boiler. I preferably make the indentations of the corrugations of each in range with those of the other compartments. The heads or end plates *I I* of the combustion-chamber I provide with ports *n*, which are in range with the indentations of the top portions of the compartments and afford access thereto for a sweeping implement to remove soot and

ashes that may gather thereon, said ports being closed by removable caps. I also provide each of the compartments D D with fire-flues *t t*, extending through the compartment at right angles to the vertical walls thereof and terminating at the exterior of said walls, and thus separated from those of the adjacent water-compartments, but preferably in line therewith, so that a cleaning-instrument can be passed through the flues of the successive compartments, the heads of the combustion-chamber being provided with the usual doors E', through which to introduce the aforesaid sweeping-instrument. I do not, however, wish to be limited to the employment of a plurality of flues *t t* in the compartment D, inasmuch as in a small boiler a single large flue *t*, extending through the center of the compartment, as shown in Fig. 7 of the drawings, may answer the purpose. The compartment D, with its flue or flues *t*, I preferably form in one piece of cast-iron.

p denotes the pipe by which the water is admitted to the boiler, which pipe is preferably connected to the lower water-leg L, and *r* represents a pipe by which hot water or steam is allowed to pass from the boiler to the part of the building to be heated. Two or more of such pipes may be connected to the tops of several compartments D D, as shown in Fig. 2 of the drawings.

F represents the door through which to introduce fuel, G the ash-pit door, H the draft-damper, and R the smoke-exit pipe.

In the operation of the described boiler the products of combustion pass from the fire-box up through the spaces *o o* between the compartments D D D, and thence through the flues *t t*, and some of the products of combustion pass along in the indentations of the corrugated exteriors of said compartments to the exit-pipe R. Each of the compartments or boiler-sections D is thus completely enveloped and in intimate contact with the products of combustion.

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

1. In combination with the fire-box, a plurality of water-compartments disposed side by side transversely over the fire-box and with radial fire-passages between said compartments, a shell inclosing the water-compartments and forming a combustion-chamber around the exterior thereof, and one or more flues horizontally through each of the water-compartments and separated from those of the adjacent compartments and communicating with the fire-box and combustion-chamber by means of the radial fire-passages between the water-compartments, substantially as set forth and shown.

2. In combination with the fire-box, a plurality of water-compartments placed side by side and across the top of the fire-box and with radial fire-passages between the compartments and having their peripheral faces corrugated, water connections between said compartments, a flue or flues through each of said water-compartments and terminating at the exterior of the vertical walls thereof, and a shell inclosing the water-compartments and forming with the indentations of the corrugated exteriors thereof longitudinal flues on the exterior of the boiler, communicating with the internal flues through the aforesaid radial passages, substantially as set forth.

3. In combination with the fire-box, a plurality of water-compartments disposed side by side with spaces between them and mounted on the fire-box crosswise thereof and having their peripheral surfaces corrugated and with the indentations of the corrugations of each in line with those of the other compartments, and cleaning-ports in the ends of the combustion-chamber and in range with the aforesaid indentations of the corrugated surfaces of the water-compartments, substantially as described and shown.

In testimony whereof I have hereunto signed my name this 22d day of September, 1890.

ALFRED CATCHPOLE. [L. s.]

Witnesses:

C. L. BENDIXON,
MARK W. DEWEY.