

W. A. CORNOCK.
BOILER.
APPLICATION FILED MAY 14, 1917.

1,412,801.

Patented Apr. 11, 1922.

3 SHEETS—SHEET 1.

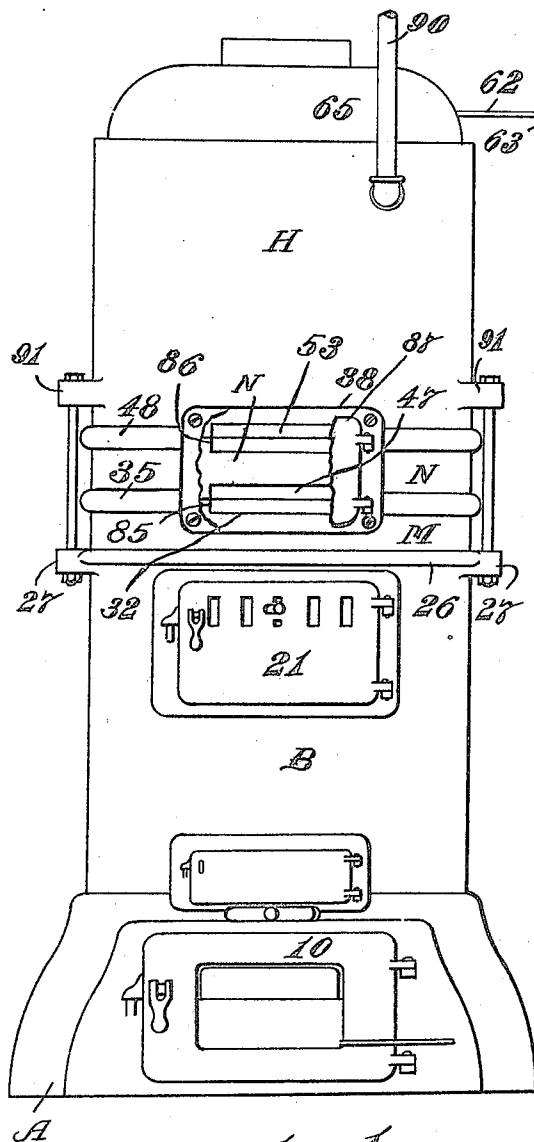


Fig. 1.

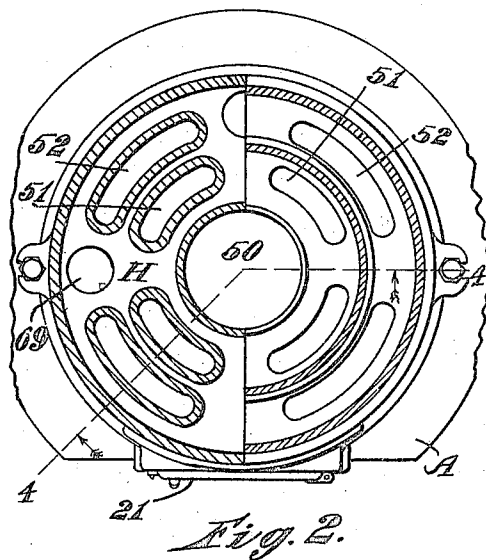


Fig. 2.

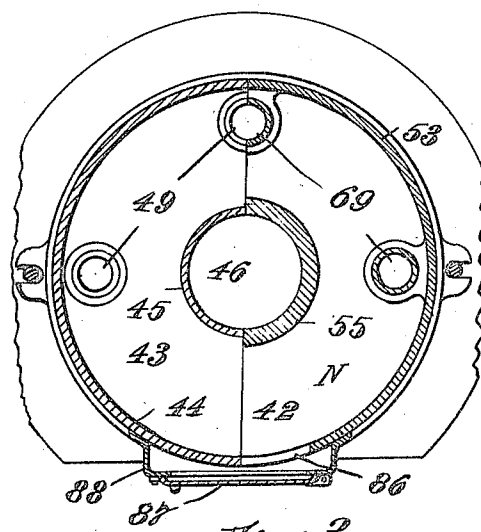


Fig. 3.

INVENTOR.
William A. Cornock
BY
Garner W. Pearson
ATTORNEY.

W. A. CORNOCK.

BOILER.

APPLICATION FILED MAY 14, 1917.

1,412,801.

Patented Apr. 11, 1922.

3 SHEETS—SHEET 2.

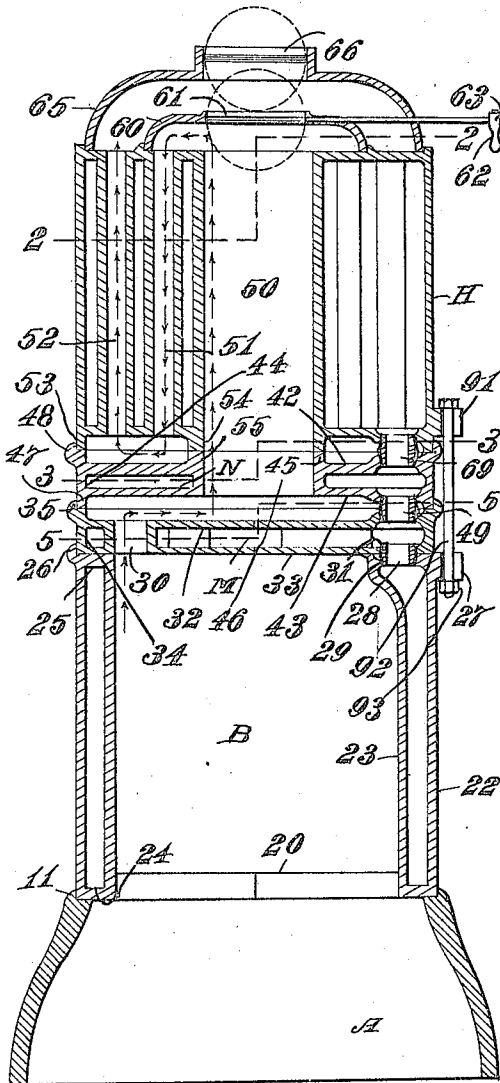


Fig. 4.

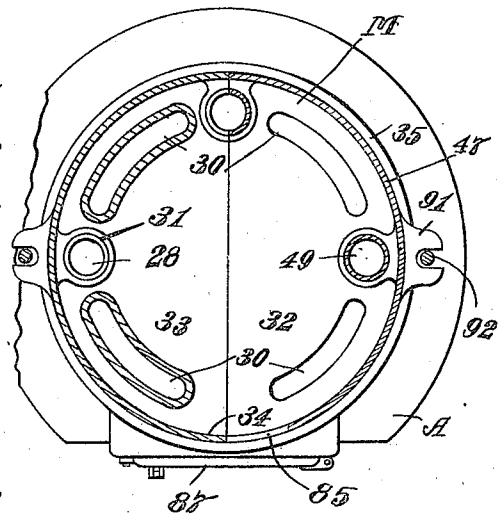


Fig. 5.

INVENTOR.

William A. Cornock

BY

Charles W. Pearson

ATTORNEY.

W. A. CORNOCK.
BOILER.
APPLICATION FILED MAY 14, 1917.

1,412,801.

Patented Apr. 11, 1922.

3 SHEETS—SHEET 3.

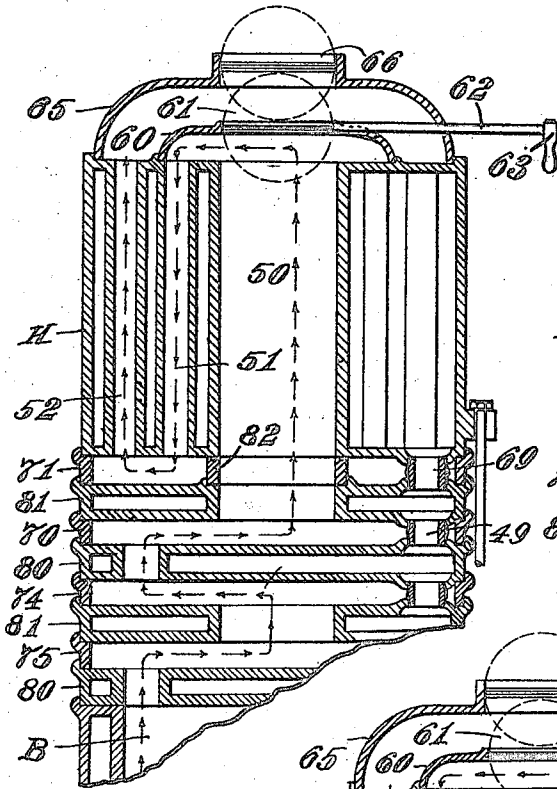


Fig. 6.

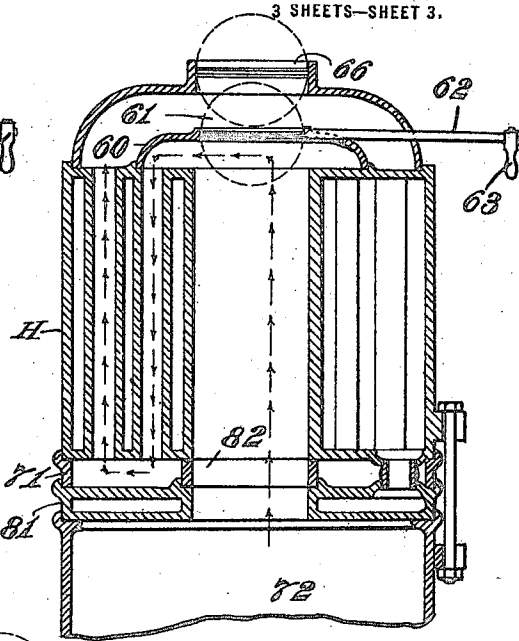


Fig. 7.

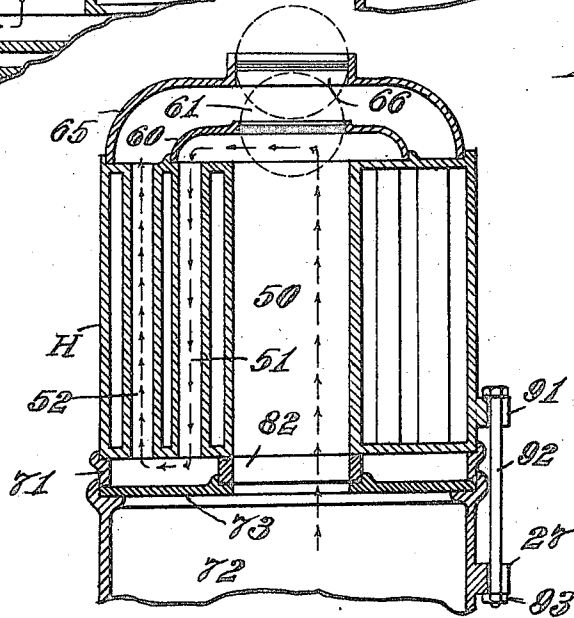


Fig. 8.

INVENTOR.

William A. Cornock

BY Gardner D. Peason

ATTORNEY.

UNITED STATES PATENT OFFICE.

WILLIAM A. CORNOCK, OF LOWELL, MASSACHUSETTS, ASSIGNOR TO WILFRID I. BURKE, OF LOWELL, MASSACHUSETTS.

BOILER.

1,412,801.

Specification of Letters Patent. Patented Apr. 11, 1922.

Application filed May 14, 1917. Serial No. 168,484.

To all whom it may concern:

Be it known that I, WILLIAM A. CORNOCK, a citizen of the United States, residing at 11 London Street, Lowell, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Boilers, of which the following is a specification.

This invention relates to boilers of the sectional upright type for heating water or similar liquid, and for producing steam therefrom.

I am aware that there are upright boilers with smoke tubes and with water tubes such as are known as tubular boilers, but this class of devices is expensive to make, the tubes must be expanded into the heads and are likely to leak at the joints, and besides this, they wear out rapidly.

My principal purpose is to provide a cast metal upright boiler which can be made in sections whereby it can be readily transported and whereby the heating surfaces can be increased by increasing the number of sections. By my construction, I provide a relatively large water heating surface for the size of the boiler, and my device can be cast and therefore cheaply made. It can be easily put together or taken apart, and it is also so constructed that it can be easily cleaned.

With my device, the water compartments are relatively thin with a large superficial area, and are so arranged, with reference to the smoke passages or flues, that such passages or flues are separated from the outside by a substantial body of water in a water compartment. With this arrangement, little, if any, heat can get outside without passing through a substantial body of water which is heated in the process.

The water compartments of the main boiler section are annular in horizontal section, while the smoke passages are relatively large and of ovoidal section. By making the smoke passages relatively large and of such shape, there is less likelihood of their becoming filled up with soot, and the draft of the device is better.

The construction is such that heat and smoke, in a relatively small boiler, must travel a relatively long distance along and around water heating surfaces.

I prefer to so arrange my various parts that a substantially direct draft can be used

in starting the fire, and in some other cases, and that thereafter an indirect draft can be used which is so directed as to pass over large heating surfaces without being unduly stopped thereby.

I therefore prefer to use an interior bonnet in which is a damper which can be controlled from the outside to cause a direct or indirect draft.

In the drawings, Fig. 1 is a front elevation. Fig. 2 is a section of the top or boiler section on line 2—2 of Fig. 4. Fig. 3 is a section on line 3—3 of Fig. 4. Fig. 4 is a vertical developed section looking in the direction of the arrows on line 4—4 of Fig. 2. Fig. 5 is a section on line 5—5 of Fig. 4. Figs. 6, 7 and 8 are vertical developed sections as if looking in the direction of the arrows on line 4—4 of Fig. 2, and show different modifications of my construction.

A is the base of a boiler or heater, and preferably forms the ash pit with an ash door of any well known construction. This base A forms the lower section of my boiler, and has at the top a flange 11 to hold the next section above in position. Door 10 is of any usual construction, and may be fixed permanently to the base.

Resting on the base section, I prefer to use a double walled or water jacketed fire box section which is preferably cylindrical and fits inside of flange 11. This section has an outer wall 22, an inner wall 23, a bottom wall 24, and a top wall 25 around the top of which is a projecting rim or flange 26. This fire box section is indicated by B.

It preferably contains a grate 20, and also has a passage or opening through the water jacket for firing which is closed by a fire door 21 of any usual construction.

This fire box section preferably is made with projecting ears 27, and through its top wall 25 has one or more passages 29 which preferably slightly taper from the top downward and inward to receive nipples 28 which I prefer to use in forming suitable water passages to connect my various water compartments.

Next above the fire box section, I prefer to locate what I will call a lower double walled or hollow water containing disk section. This disk section has a top wall 32, bottom wall 33, and outside wall 34, and it preferably has at the top an upstanding flange or

rim 35. In this lower disk are vertical smoke passages 30 which I locate near to but not at the outer edge, and which I prefer to make of ovoidal shape, somewhat curved, so that they will form an incomplete ring near the outer edge.

I also provide through the bottom, the passages 31 which preferably slightly taper inward and upward, and which register with the passages 29 of the fire box section.

In connecting my water sections, I prefer to use such tapering passages as 29 and 31 and to place in them nipples such as 28 which form simple and tight water passages.

The next section which rests upon lower disk M, I will call the upper double walled or hollow water containing disk section N. This section is annular in shape having a top wall 42, a bottom wall 43, outside wall 44 and inside wall 45 which latter forms a central smoke passage 46. It preferably has downwardly depending flange 47 at its lower outer rim, and an upstanding flange 48 at its upper outer rim, and another upstanding flange 55 at its inner upper rim adjoining smoke passage 46.

Flanges 47 and 35 together form what I will call a lower separating ring between the lower and upper disks. At the bottom of this upper disk are suitable tapering passages which register with other similar tapering passages in the lower disk to receive nipples 49, forming water passages through which the water can circulate between the disks.

I have shown above the lower and upper disks, what I will call a boiler section H which is also of substantially cylindrical form, and has a depending flange 53 at its lower outer rim which rests upon flange 48 together forming another separating ring between the sections. It also has a flange 54 at its lower inner rim and this, together with flange 55, forms an inner separating ring which also continues the smoke passage 46.

Extending vertically through the boiler section H, is the central vertical flue 50, and one or more interior down draft flues 51 which are out of contact with its inner wall, and one or more exterior up draft flues 52 which are out of contact with its outer wall. These up and down draft flues are preferably of ovoidal horizontal section and are curved, and are also arranged so as to form incomplete rings of flues one inside the other. Between these flues, both outside and inside, are relatively thin bodies of water which connect with the upper disk N by means of suitable passages in which are inserted the nipples 69.

The flanges 53, 48, 54 and 55 together with the top wall 42 of the upper disk, form an annular passage between the lower ends of the down draft flues 51 and the updraft flues 52.

A steam or hot water outlet pipe or passage 90 may enter the top of the main boiler section.

For the purpose of cleaning, I provide an opening 85 which extends through the bottom flange 47 of the upper disk and top flange 35 of the lower disk as shown in Figs. 1 and 5, and a similar opening 86 in line therewith and extends through flange 48 and flange 53 as shown in Figs. 1 and 3. Around these openings may be bolted or otherwise fastened, a frame 88 which carries a clean-out door 87. By opening this door, the space between the upper and lower disks and the connecting smoke passage between the lower ends of the down draft and up draft flues of the boiler section can be reached with a brush, and the up draft and down draft flues can also be reached by using a flexible brush.

For ordinary cleaning, it is only necessary to reach the bottom of pockets, such as the top of the lower disk and the top of the upper disk, as it is in such places that dust most rapidly accumulates.

By removing the bonnets at the top, the vertical flues can be thoroughly cleaned out.

I prefer to use an interior bonnet 60 which extends over the central and interior flues, and which is preferably provided with a damper 61 directly over the central flue. This damper can be operated by means of a rod 62 which terminates in a handle 63 outside the boiler. By opening this damper, the smoke and products of combustion may be allowed to pass directly out from the central flue, thus making a direct draft which is useful under some conditions, as when starting a fire, or the damper can be closed which will force the heat and smoke to circulate through the interior flues 51 and exterior flues 52.

I also provide an exterior bonnet 65 which extends over the exterior flues and directs the products of combustion into the usual chimney pipe connection 66. I may use a damper in this latter of any usual form as shown by the dotted lines.

These bonnets or domes 60 and 65 preferably rest on the top of the boiler section and are comparatively light so that they can be readily removed if necessary to clean the vertical flues.

I find it convenient to provide the upper or boiler section H with projecting ears 91 positioned to be directly above the ears 27 on the fire box section. By means of bolts 92 which pass vertically through corresponding ears and nuts 93, the parts can be held firmly in position.

For convenience in building up additional sections, I may use independent separating rings 70, 71, 74 and 75 between the various sections instead of the annular flanges shown in Figs. 1 to 5. As shown in Fig. 6, I may use on the top of the fire box section B, a

lower water disk 80 with a bead but without a flange, and upon this I may place a lower separating ring 75, and on this an upper water disk 81. On this upper disk, I may use a single outer ring such as 74, leaving out the inner ring so that the products of combustion can properly circulate as shown by the arrows. Disk 80, except for the flange, is the same as M, and disk 81 except for the flanges is the same as N.

I may continue to build up on top of ring 74 by adding another section 80, a ring 70 similar to 75, another section 81, and another ring 71 similar to 74 and so on indefinitely, the only difference being that between the top disk section and the boiler section, I must use an inside separating ring 82 to direct the draft up through central smoke passage 50, and between the lower ends of flues 51 and 52.

As shown in Fig. 7, in place of a double walled water jacket for the fire box, I may use a single walled fire box such as 72, and may leave out the lower water disk section entirely and may place the upper water disk section 81 directly upon it. The rings 71 and 82 and boiler section H are the same. This construction does not give as large a heating surface, but is useful in some types of boilers.

As shown in Fig. 8, I may not only use a single walled fire box 72, but may leave out both the upper and the lower water disks replacing them by a solid annular disk 73 which rests upon the fire box. Upon this disk 73 I may place the outer and inner rings 71 and 82 whereby the passage or connection between the lower ends of flues 51 and 52 is made.

I claim:

1. In a boiler, the combination of a cylindrical double walled water jacket which extends around to form the sides of a fire box, a lower double walled water containing disk having smoke passages proximate its outer edge and connected with and resting on the water jacket, a lower annular ring which rests on such disk, an upper double walled water containing disk which rests on such ring and has a central smoke passage, a water connection between the upper and lower disks, upper, outer and inner rings which rest on the upper disk, a boiler section which rests upon the upper rings and which has a central up draft flue together with interior down draft flues out of contact with its inner wall and exterior up draft flues out of contact with its outer wall, an interior dome

which extends over the central and interior flues, and an exterior dome which extends over the exterior flues.

2. In a steam boiler, the combination of a fire box with a double walled water containing disk which rests on such fire box and has a central smoke passage, upper, outer and inner rings which rest on such disk, a boiler section which rests on such upper rings and has a central up draft flue together with interior down draft flues out of contact with its inner wall, and exterior up draft flues out of contact with its outer wall, and an interior dome which extends over the central and interior flues, together with an exterior dome which extends over the exterior flues.

3. In a boiler, the combination of a cylindrical double walled water jacket which extends around to form the sides of a fire box, with one or more series of water containers each comprising a lower double walled water containing disk having smoke passages proximate its outer edge and connected with and resting on the water jacket, a lower annular ring which rests on such disk, an upper double walled water containing disk which rests on such ring and has a central smoke passage, a water connection between the upper and lower disks, and an outer ring which rests on the upper disk, an inner ring which rests on the upper disk of the top series, a boiler section which rests upon the upper rings and which has a central up draft flue together with interior down draft flues out of contact with its inner wall and exterior up draft flues out of contact with its outer wall, an interior dome which extends over the central and interior flues, and an exterior dome which extends over the exterior flues.

4. In a steam boiler, the combination of a fire box, with a double walled water containing disk which is supported over such fire box and has a smoke passage, upper, outer and inner rings which rest on such disk, a boiler section which rests on such upper rings and has a central up draft flue together with interior down draft flues out of contact with its inner wall, and exterior up draft flues out of contact with its outer wall, and an interior dome which extends over the central and interior flues, together with an exterior dome which extends over the exterior flues.

In testimony whereof I affix my signature.

WILLIAM A. CORNOCK.