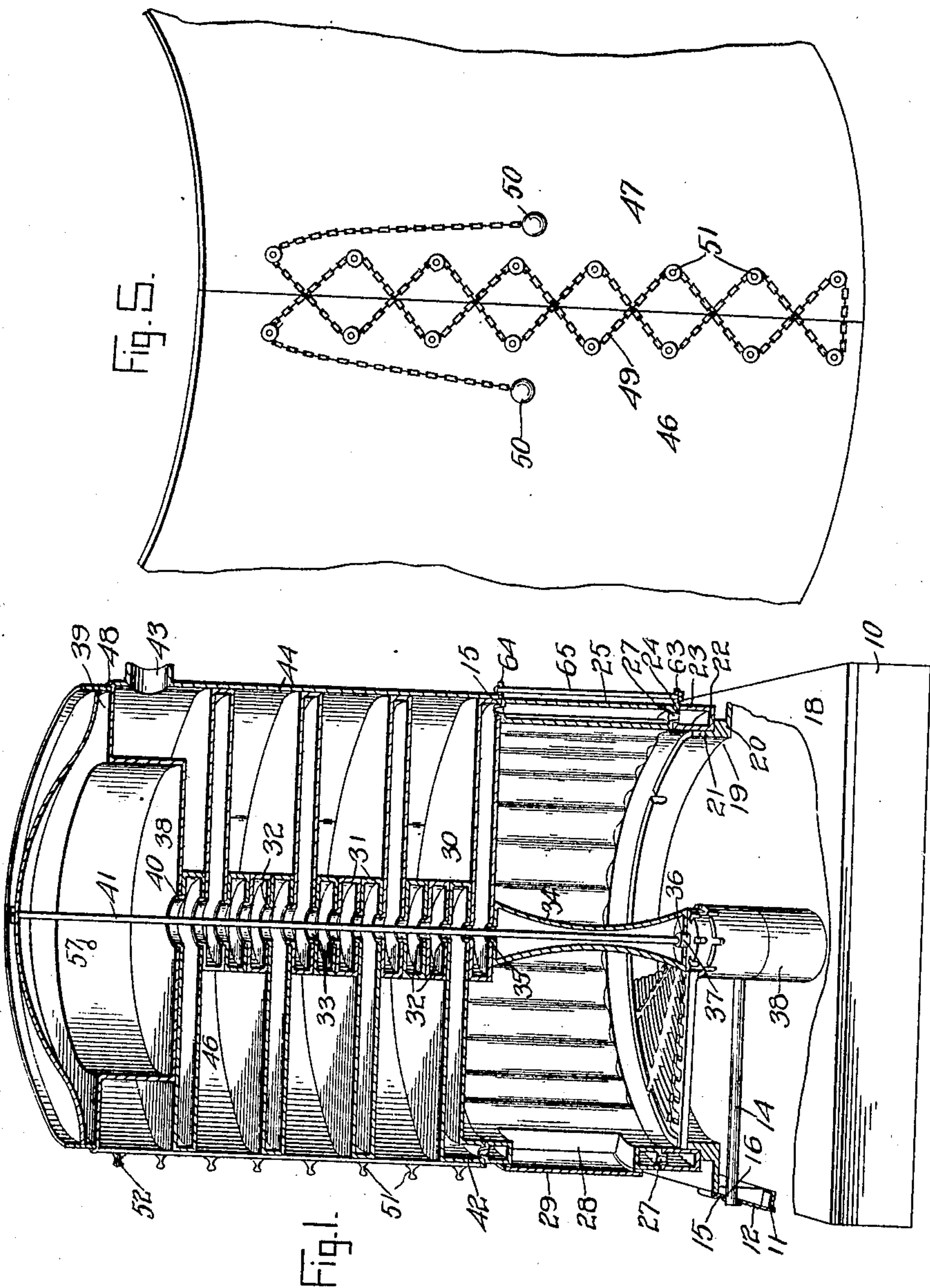


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BOILER.

APPLICATION FILED APR. 29, 1908.

920,057.

Patented Apr. 27, 1909.
2 SHEETS—SHEET 1.



Witnesses

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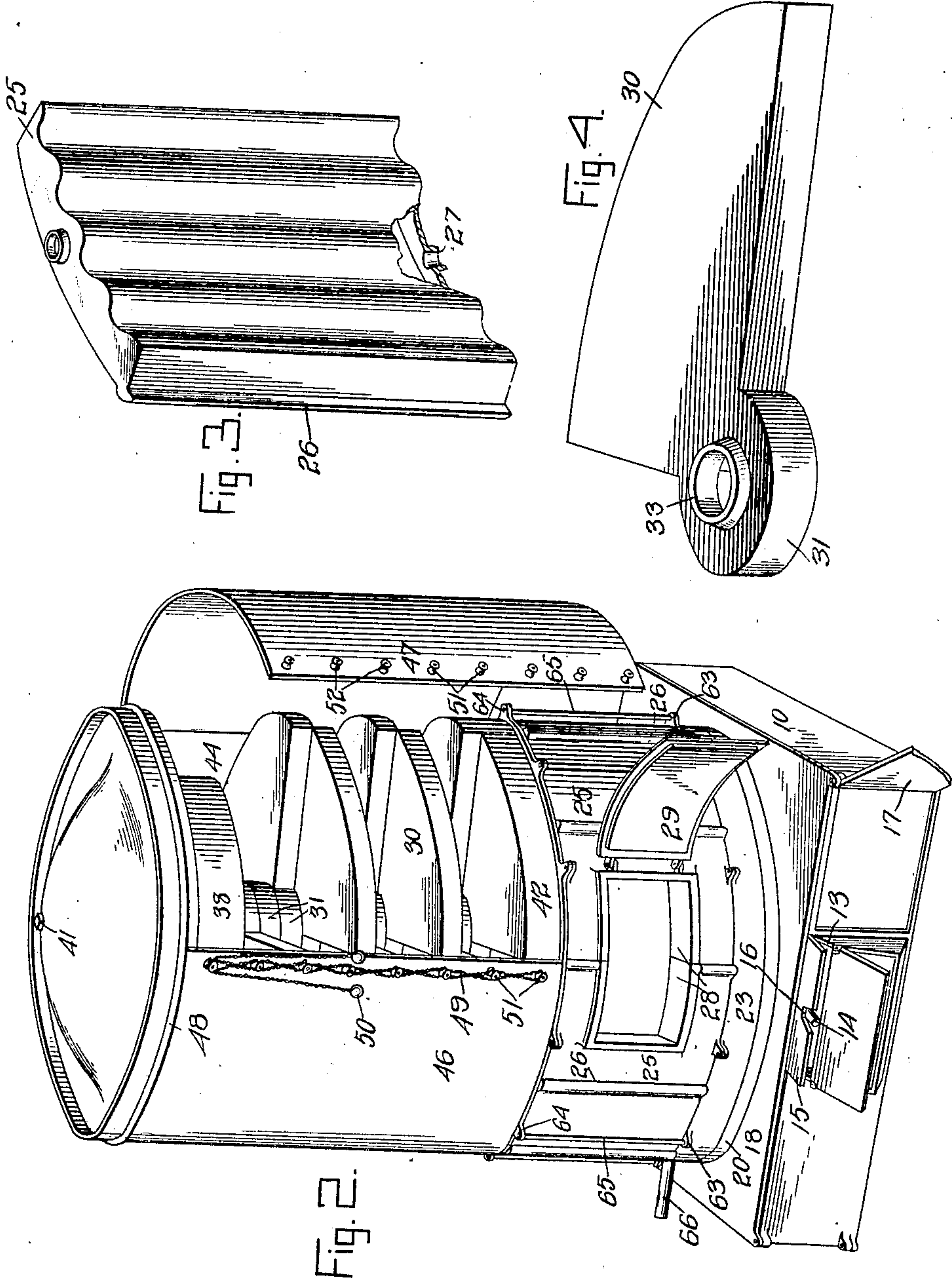
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BOILER.

No. 920,057.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, WILLIAM A. HENRY, a citizen of the United States, residing at North Adams, in the county of Berkshire, State of Massachusetts, have invented certain new and useful Improvements in Boilers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to low pressure steam boilers such as are employed for generating steam for heating purposes, the invention having for its object the provision of such an arrangement of baffle plates as will present a tortuous or helical smoke flue to insure a maximum absorption of heat from the products of combustion that pass upwardly to the smoke pipe.

A further object of the invention is the provision of means for facilitating cleaning of the smoke flue and also the provision of a novel form of grate which will permit of thorough cleaning of the fire.

Other objects and advantages of the invention include the provision of a structure wherein the parts may be easily and quickly assembled and disassembled, and will be understood from the following description.

In the drawings forming a portion of this specification and in which like numerals of reference indicate similar parts in the several views, Figure 1 is a sectional perspective view showing a boiler embodying the present invention, Fig. 2 is a perspective view of the boiler with a part of the casing swung to open position to permit of cleaning of the smoke flue, Fig. 3 is a perspective view showing one section of the fire box, Fig. 4 is a detail perspective view showing one of the baffle plate sections, and, Fig. 5 is a detail view showing the means for holding the casing sections together.

Referring now to the drawings, the present structure comprises a base in the form of an ash-box 10 having the usual door opening 11 in its front provided with a hinged closure 12 and above which is an opening 13 through which projects the shaker bar 14, the opening 13 having a closure 15 which is hinged at its upper edge, and midway of the ends of the lower edge of which is a notch 16 which when the closure is in closed position receives the shaker bar 14 and holds the latter

against lateral movement. The remaining portion of the front of the base 10 is formed by doors 17 and 17^a which may be swung to open or closed position as desired.

Upon the base 10 is disposed a top plate 18 having a central opening 19 at the edge of which rises an annular flange 20, the upper portion of which is reduced in thickness as shown at 21 whereby there is produced a shoulder 22 at the base and at the outer side of the portion 21. Upon the shoulder 22 is disposed a hollow cross sectionally rectangular ring 23 in which are formed at intervals the inwardly tapered perforations 24.

Upon the ring 23 is disposed the fire-box wall which is cylindrical in shape and is made up of segmental sections 25 each of which is smooth on its outer face and is ribbed on its inner face as clearly illustrated in Fig. 3, each section 25 having at one vertical edge a flange or lip 26 that overlaps the next section so as to cover the slight interspace between the sections. Each of the sections 25 is hollow and from the bottom of each section projects a tapered nipple 27 commonly known as a push nipple which fits snugly into the corresponding perforation 24 to make a water-tight joint. Two of the sections 25 have a door opening 28 therein which is provided with the usual hinged closure 29, the door opening being formed through the adjacent end portions of said sections. Above the fire-box are a series of segmental baffle plates each of which is a quadrant, as illustrated, and all of which plates are hollow. These baffle plates are shown at 30 and at the center of curvature of each plate is what may be termed a rounded hub 31 which is hollow and communicates with the body of the plate, the hub of each plate having an inwardly tapered perforation 32 at the center of its bottom and a tapered push nipple 33 at the center of its upper face and through which communication is had with the upper portion of the hub. The segmental sections are disposed with their hubs superimposed, the nipples of the hubs engaging tightly in the perforations of the hubs thereabove and the nipples and perforations of the several sections successively increasing in diameter from the bottom section upward. The lowermost hub rests upon a hollow column 34 having a push nipple 35 at its upper end which fits the perforation 32 in said hub.

The lower end of the column 34 has a tapered perforation 36 that receives the tapered plug 37 at the upper end of a post 38 that rises from the bottom of the ash-pit, this tapered plug being in effect a push nipple.

A steam dome is provided and comprises a narrowed cylindrical lower portion 38 and an upper hood portion 39 which projects beyond the wall of the portion 38 as illustrated, the portion 38, having a tapered perforation 40 in its bottom which receives the push nipple 33 of the uppermost segment-hub. To hold the push nipples snugly in the perforations and thus insure water-tight and steam-tight joints, a bolt 41 is passed upwardly through the post 38, the column 34 and through the perforations and nipples of the hubs 31 and through the top of the hood 39 of the steam dome, the bolt serving to draw the parts together.

The lowermost baffle plate rests directly with its flat bottom face upon the corresponding wall sections 25 while the succeeding three plates or segmental sections have each a depending hollow flange 42 which rests upon the corresponding portion of the fire-box wall, the height of the flange of the second plate being equal to the height of the first plate so that the bottom face of the second plate touches the plane of the upper face of the first plate. The height of the flange of the third plate is equal to the height of the flange of the second plate plus the thickness of the second plate while the height of the flange of the fourth plate is equal to that of the third plate plus the thickness of the third plate. The plates are disposed with their adjacent side faces touching the same planes. The remaining plates are without flanges and are supported entirely from their hubs. The adjacent side faces of the plates touch the same planes as is the case with the lower four sections, so that there is provided a stepped helical passage between the baffle plates and leading from the fire-box to the space surrounding the portion 38 of the steam dome and beneath the hood 39, from which latter portion there leads a collar 43 for attachment of a smoke pipe.

The collar 43 is carried by a section 44 of the boiler jacket which section is connected rigidly to the hood 39 and rests with its lower end upon the radiating baffle plate flange 45 where it is held in any suitable manner. The rigid or fixed section 44 in practice, forms substantially a third of the entire jacket and hinged to its vertical edges are the jacket sections 46 and 47 which are adapted to swing into and out of position between the baffle plate flange 45 and the hood flange 48. The sections 46 and 47 are provided at their free vertical edges with pivoted grooved pulleys over which is laced a

chain 49 having weights 50 at its ends for holding it taut. By this means, the hinged sections are held securely in closed positions. The grooved pulleys are shown at 51 and are mounted on spindles 52. This arrangement permits of exposure of the helical flue so that it may be readily cleaned, it being understood that the flue is designed to carry the products of combustion from the fire-box to the smoke pipe collar.

It is of course understood that in the present construction, there are provided the usual gages and other equipments, the feed of the boiler being through the pipe 66 into the base ring 23 while steam is taken off from the dome through a pipe engaged in the opening 57, the circulation being upwardly from the ring 22 through the fire-box wall and through the baffle plates to the steam dome.

What is claimed, is:—

1. A boiler comprising a helical arrangement of superimposed segmental plates, said plates being hollow and intercommunicating, a hollow column upon which the plates are supported and with which the lowermost plate communicates, a hollow fire-box surrounding the post and communicating with the lowermost plates and a jacket inclosing the plates.

2. A boiler comprising a helical series of superimposed hollow baffle plates communicating at the axis of the helix, a steam dome communicating with the uppermost baffle plate upon which it rests, a supporting column for the lowermost baffle plate, and means passed through the column, the dome and the communicating portions of the baffle plates and for holding said members together.

3. A boiler comprising a hollow base ring, a wall including hollow sections disposed upon the ring, a helical series of superimposed hollow baffle plates, the lowermost baffle plates resting upon and communicating with the hollow wall sections, and a jacket inclosing the plates.

4. A boiler comprising a hollow base ring, a wall including hollow sections disposed upon the ring, a helical series of superimposed hollow baffle plates, the lowermost baffle plates resting upon and communicating with the hollow wall sections, and a jacket inclosing the plates, the baffle plates next above the hollow wall with the exception of the lowermost baffle plate having depending hollow flanges resting upon the wall and through which flanges communication between the wall and the plates is obtained.

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

WILLIAM A. HENRY

Witnesses:

GEO D. CLEVELAND,
WILLIAM D. BEER.