No. 681,542. Patented Aug. 27, 1901.

H. H. GRAFF.

PORTABLE BOILER.

(Application filed Apr. 18, 1901.)

(No Model.)

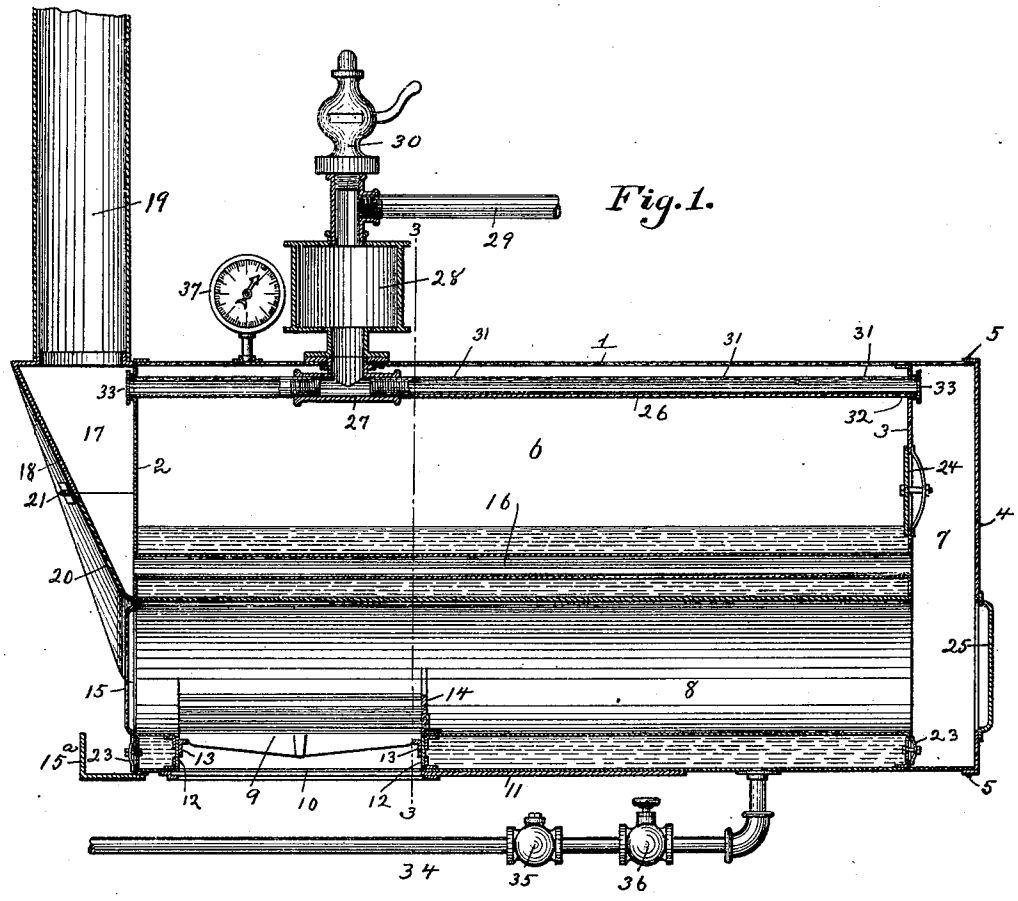

Fig. 1.

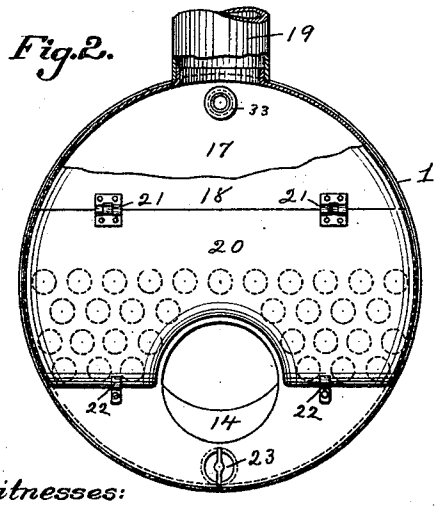

Fig. 2.

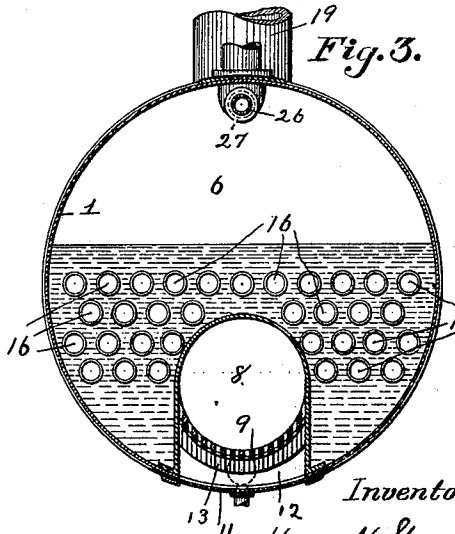

Fig. 3.

Witnesses:
Walter Lamarre
Fred D Sweet.

Inventor:
Harry H. Graff
By Kay & Potter
Attorneys.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

HARRY H. GRAFF, OF PITTSBURG, PENNSYLVANIA.

PORTABLE BOILER.

SPECIFICATION forming part of Letters Patent No. 681,542, dated August 27, 1901.

Application filed April 18, 1901. Serial No. 56,428. (No model.)

To all whom it may concern:

Be it known that I, HARRY H. GRAFF, a resident of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Portable Boilers; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to steam-boilers, and has for one object a boiler which can be easily transported or moved from place to place and one so constructed as to facilitate the making, repairing, and cleaning of the same.

In the oil and gas regions, where power is necessary for drilling and pumping purposes, steam-engines must be largely used, and inasmuch as the engines must be frequently moved and many of the places are accessible only with difficulty much inconvenience has been experienced in transporting the steam-boilers necessary for the engines.

Another object of my invention is to provide a boiler which can be readily transported even to comparatively inaccessible places and which can be moved from place to place with readiness.

To this end it comprises a boiler, together with the furnace therefor, the whole being contained within the cylindrical shell of the boiler and the stack, pressure-gage, and dome being readily detachable, so that the boiler can be rolled in moving.

In most water-boilers more or less of the water escapes with the steam, thereby producing a large amount of water of condensation in the engine. To overcome this, it has been found necessary to provide the boilers with large domes on the top for "drying" the steam, as it is called. Any such arrangement, however, as that would interfere seriously with the ready transportation of the boiler, and I have therefore placed the means for drying the steam within the shell of the boiler. In combination with the same I also use an external chamber or dome; but this is not absolutely necessary, and where it is used this is made readily detachable, so as not to interfere with the moving or transportation of the boiler.

In the accompanying drawings, Figure 1 is a longitudinal vertical section through my improved boiler. Fig. 2 is a front end elevation of the same, parts being broken away; and Fig. 3 is a transverse section on the line 3 3, Fig. 1.

The boiler comprises the cylindrical body or shell 1, having a front head 2, a transverse plate or partition 3, and a rear head 4, the latter being secured to the shell so as to be readily detachable therefrom—as, for instance, by means of the bolts 5. The space between the head 2 and partition 3 comprises the water-chamber 6 of the boiler, and the space between the partition 3 and rear head 4 comprises the combustion-chamber 7. Extending through the water-chamber 4, near the lower side of the boiler, is a large uncorrugated circular flue 8, which near the front of the boiler is provided with the opening for the grate 9, the walls of the flue being bent down and secured to the shell 1, the latter being provided with the opening 10 underneath the grate 9, said opening being closed by a slide 11. On the walls 12 of the opening 10 are secured curved supports 13, on which the grate 9 rests, the latter being concave, as shown. A bridge-wall 14 is provided, over which the fire and flame must pass. The front end of the flue 8 is closed by means of the fire-door 15. Secured to the front end of the boiler below the door 15 is the pan 15^a for receiving the ashes, cinders, and other refuse from the fire-flue. Also extending through the water-chamber 6 are the fire-flues 16, which communicate at their rear ends with the combustion-chamber 7 and at the forward ends with the chamber 17, the latter being formed by a hood 18, secured to the front end of the boiler and being circular in outline, as shown, so as not to project beyond the shell of the boiler. The upper portion of the hood 18 is provided with a flanged opening, over which the stock 19 is set, so that it can be readily removed without the necessity of cutting rivets or similar fastening means. The lower portion 20 of the hood 18 is hinged to the upper portion, as at 21, and is secured in place by suitable means, as buttons 22, so that it can be read-

ily swung up out of the way for cleaning or repairing the flues. The fire-flues 16 are placed only in the lower half of the water-chamber and principally at the sides of the large flue 8, as shown. The water-chamber is provided at each end on the lower side of the boiler with the hand-holes 23 for cleaning the boiler and at its rear end above the flues 16 with a manhole 24, whereby access may be had to the interior of the boiler for repairing or cleaning. The rear head 4 of the boiler is provided with the door 25. In the upper side of the water-chamber 6 I provide a pipe 26, this pipe being formed in two sections, as shown, which screw into the fitting 27, which is connected to the shell 1, as shown. Suitably secured to the upper side of the shell 1, so as to be readily removable without the necessity of cutting rivets or similar fastening means, is the chamber 28, which forms, in effect, a dome for the drying of the steam. With this chamber communicates the steam-supply pipe 29, and above the same is the safety blow-off valve 30. The pipe 26 is provided along its upper side with a series of perforations or holes 31 for admitting the steam from the boiler into said pipe, from whence it passes into the chamber 25 and then to its place in use. Said pipe is also provided with the drain-hole 32. This pipe 26 projects through the head 2 and partition 3 of the water-chamber and is provided at its ends with the caps 33, which close the ends of said pipe, but which can be readily removed in order to clean the pipe or remove the same for repairs. Communicating with the water-chamber 6 on the lower side of the boiler is the supply-pipe 34, which is provided with the usual check-valve 35 and globe cut-off valve 36. Removably secured to the top of the shell 1 is the steam-gage 37.

In the use of my boiler the fire is built on the grate-bars 9, the fuel being supplied through the door 15 and the draft through the sliding door 11, and the ashes are also removed through this sliding door 11. The flame and heat from the fire pass up over the bridge-wall 14 and through the flue 8 into the combustion-chamber 7, from which they pass through the fire-flues 16 into the chamber 17 in the front of the boiler and out at the stack. The water-supply is fed to the boiler through the pipe 34 and is maintained at such a height that it will at all times cover the flues 16 as well as the large flue 8. The heat from the fire passing through this large flue 8 and smaller flues 16 heats the water and generates the steam, the water being in contact with the outside of each of the flues 16 as well as with the outside of the large flue 8, so that practically the walls of the furnace for the boiler provide a heating-surface for the water. The steam generated by the boiler rises to the upper part of the steam and water chamber 6, whence it passes through the openings 31 in the tube 26, and inasmuch as these openings are in the upper side of the tube it is not possible to draw water along with the steam. The pipe 21 therefore serves as a reservoir or condenser for the steam in the upper part of the boiler, in which the steam is dried or condensed, and this reservoir is contained within the outer shell of the boiler. If any moisture should pass over with the steam, it is condensed and flows out through the drain-hole 32, and any remaining moisture would be further condensed in the chamber 28 before it passes to the engine or other place of use through the pipe 29. All the other parts of the boiler—that is, the furnace and the steam-drying portion—are contained within the cylindrical shell of the boiler, and the only projecting portions are the stack 19, gage 37, and chamber or dome 28; but each of these is made so as to be readily detachable from the boiler without the necessity of cutting rivets or similar fastening means, so that in moving or transporting the boiler the same can be rolled, if desired. Furthermore, the different hand-holes and manholes are so arranged as to facilitate access to the boiler for cleaning and repairing, and the construction of the boiler is such that no stay-bolts or crown-sheet are required, thus cheapening its original cost and any repairs thereof.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. A steam-boiler comprising a cylindrical shell, a water-chamber and combustion-chamber therein, a stack and steam-collecting chamber connected thereto so as to permit their ready removal without the necessity of cutting rivets or like fastening means, a large flue or pipe extending through the water-chamber to the combustion-chamber, a burner in said flue, and fire-flues extending through the water-chamber from the combustion-chamber to the stack.

2. A steam-boiler comprising a cylindrical shell, a water-chamber and combustion-chamber therein, a chamber at the front end of the boiler, a stack and steam-collecting chamber connected thereto by means which permit their ready removal without cutting rivets or the like, a large flue or pipe extending through the water-chamber to the combustion-chamber, a burner in said flue, and fire-flues extending through the water-chamber from the combustion-chamber to the chamber at the front end of the boiler.

3. A steam-boiler comprising a cylindrical shell, a water-chamber and combustion-chamber therein, a furnace included within said shell, fire-flues extending through the water-chamber from the combustion-chamber to the stack, and a stack and steam-dome connected to said boiler by means which permit their ready removal without cutting rivets or the like.

4. A steam-boiler comprising a cylindrical shell, a furnace contained within said shell, a stack and steam-collecting chamber connected thereto by means which permit their ready removal without the necessity of cutting rivets or the like, fire-flues and a steam and water space in said boiler, a steam-drying means communicating with the steam-space in the boiler and with the steam-collecting chamber, said steam-drying means being located within the cylindrical shell.

In testimony whereof I, the said HARRY H. GRAFF, have hereunto set my hand.

HARRY H. GRAFF.

Witnesses:
F. W. WINTER,
ROBERT C. TOTTEN.