No. 691,907. Patented Jan. 28, 1902.

B. A. KEELER & R. D. FILDES.

STEAM BOILER.

(Application filed May 9, 1901.)

(No Model.)

FIG. 1.

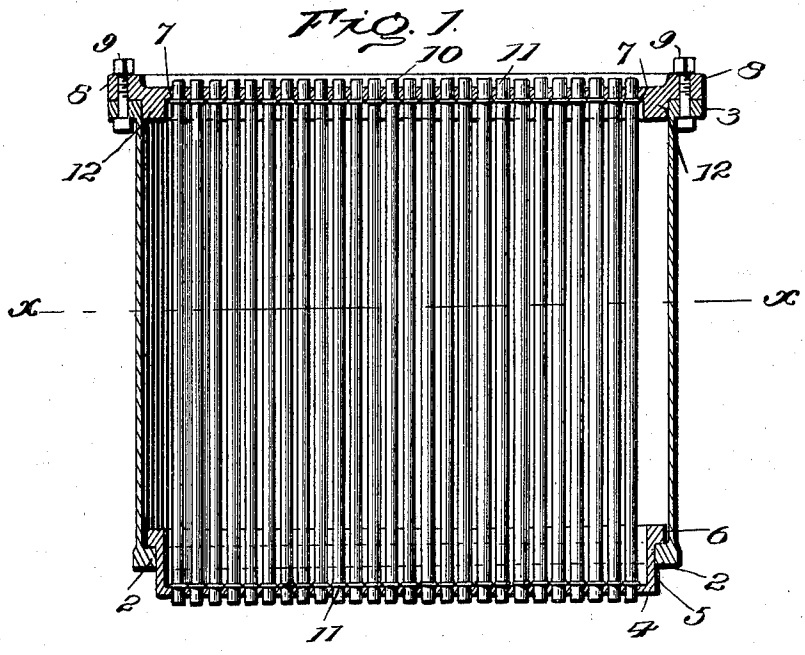


FIG. 2.

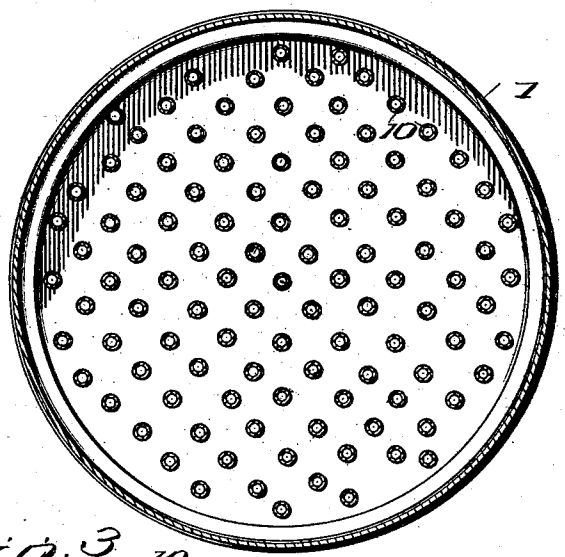
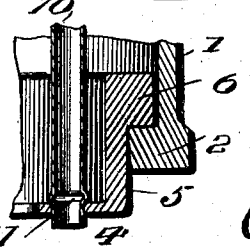


FIG. 3.



Witnesses
Jas. Finnie
Percy L. Worldridge.

Inventors
B. A. Keeler
R. D. Fildes
By
R. B. A. Keeler
Attorneys

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

UNITED STATES PATENT OFFICE.

BURRELL A. KEELER AND ROLLIN D. FILDES, OF CHICAGO, ILLINOIS.

STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 691,907, dated January 28, 1902.

Application filed May 9, 1901. Serial No. 59,467. (No model.)

To all whom it may concern:

Be it known that we, BURRELL A. KEELER and ROLLIN D. FILDES, citizens of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Steam-Boilers; and we 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.

Steam-generators of the flue and tubular type require to be cleaned, inspected, and the tubes to be replaced at frequent intervals, and particularly is this the case with small-sized boilers which are required to generate steam under high pressure for the propulsion of vehicles and water-craft.

In accordance with this invention the heads of the boiler are separable from the shell, and the flues or tubes have detachable connnection with the heads and serve as stays to hold them apart.

The foregoing features are plain from the following description and the drawings hereto attached, in which—

Figure 1 is a vertical central section of a steam-boiler embodying the invention. Fig. 2 is a section on the line X X of Fig. 1 looking in the direction of the arrows. Fig. 3 is a detail view showing the manner of connecting the tubes or flues to the heads.

Corresponding and like parts are referred to in the following description and indicated in all the views of the drawings by the same reference characters.

While the invention is specially designed for small-sized steam-boilers, it is to be understood that it can be embodied in boilers of large size and of any type comprising in their construction tubes or flues. The cross-sectional outline of the boiler is immaterial, and, as illustrated, the boiler is of the conventional circular form. The shell 1 is provided at one end with a shoulder 2 and at its opposite end with a flange 3, and the head 4 has its rim 5 formed with a shoulder or flange 6 to abut and engage with the shoulder 2 of the shell 1. The relative position of the shoulders 2 and 6 is immaterial, so long as they abut and form an interlocking joint between the parts 1 and 4. It is preferable, as shown, to have the shoulder 2 extend inward from the shell and the shoulder 6 to extend outward from the rim 5, this construction admitting of the head 4 passing through the shell 1 from the upper or flanged end 3 and held in place by engagement of the shoulders 2 and 6. These shoulders may be formed in any manner, either by bending the end portions of the parts 1 and 5 or by thickening the same. The head 7, closing the upper end of the shell 1, overlaps the outer flange 3, and its outer portion is thickened, as shown at 8, and formed with a series of openings corresponding in number and position with like openings in the flange 3 for the reception of bolts 9, by means of which the parts are secured and clamped after being assembled. The heads 4 and 7 have openings in coincident relation for the reception of opposite ends of the tubes or flues 10.

The tubes or flues 10, in addition to their usual function, constitute stays for the heads 4 and 7 to hold them apart and admit of the clamping action of the bolts 9 in drawing the parts firmly together. The joints between the ends of the tubes and the respective heads may be formed in any manner, so long as they serve to limit the inward movement of the head. The usual way is to enlarge the tubes adjacent to their extremities to form shoulders 11, as shown most clearly in Fig. 3, and these shoulders overlap the inner side of the heads adjacent the openings formed therein for the reception of the terminal portions of the tubes. This construction limits the inward movement of the heads and is only one of many forms that may be adapted for this purpose. When assembling the parts, the head 4 is placed in position by passing it through the flanged end of the shell 1, and the tubes or flues are next placed in position by having their lower ends fitted into the openings of the head 4, after which the head 7 is fitted over the flanged end of the shell and the upper ends of the tubes let into the openings provided therein for their reception. When the parts are thus assembled, a small space should exist between the flange 3 and the opposite portion of the head 7, the tubes 10 serving to hold the heads in proper position. The bolts 9 are next placed in position and are tightened until the parts are drawn

together to make steam-tight joints. If found necessary, packing may be interposed between the joints of the several parts in order to secure close connection to prevent escape of steam. When it is required to gain access to the interior of the boiler, either for cleaning, inspection, or to replace one or more of the tubes by new ones, it is only necessary to remove the bolts 9, when the head 7 can be lifted, the tubes removed, and the head 4 drawn from the shell 1. This construction requires a single set of fastenings only, one being necessary for the head 4, because of the engaging shoulders 2 and 6. Inasmuch as boilers of this class require frequent attention, the advantages of the invention will be readily manifest.

The head 7 has an annular rib or shoulder 12 to enter the upper end of the shell 1 and prevent lateral displacement thereof when the bolts 9 are removed. The flues or tubes may be secured to the heads 4 and 7 in any of the usual ways, thereby admitting of the said flues and heads being removed from and placed within the shell as an entire structure. The flues 10 in the capacity of stays or braces hold the head 4, with its shouldered rim, in contact with the inner shoulder 2 of the shell and enable the bolts 9 to clamp the parts.

Having thus described the invention, what is claimed as new is—

1. In a steam-boiler of the flue and tubular type, a shell, a head detachably fitted to one end of the shell, interlocking shoulders between said head and shell, a second head for closing the opposite end of the shell, tubes interposed between the heads and serving as stays to limit the inward movement thereof, and fastenings for securing the last-mentioned head to the shell and clamping the parts, substantially as set forth.

2. A flue and tubular boiler comprising a shell, a head detachably fitted to an end of the shell, interlocking shoulders between said head and shell, a second head fitted to the opposite end of the shell, tubes having detachable connection at their ends with the said heads and serving as stays to limit their inward movement, and fastenings for securing the second head to the shell and clamping the parts, substantially as set forth.

3. A boiler comprising a shell having an inner shoulder at one end, a head having a rim formed with an outer shoulder and removably fitted within the shell and held in place by engagement of the aforesaid shoulders, a second head fitted to the opposite end of the shell, tubes interposed between the heads and serving as stays, and means for securing the second head to the shell and clamping the parts, substantially as set forth.

4. A boiler comprising a shell having an inner shoulder at one end and an outer flange at the opposite end, a head having a rim formed with an outer shoulder and removable through the flanged end of the shell and held therein by engagement of the aforesaid shoulders, a second head having an outer thickened portion, tubes interposed between the two heads and constituting stays, and bolts fitted in corresponding openings in the outer flange of the shell and the thickened edge portion of the said second head to secure the latter in place and clamp the parts, substantially as specified.

In testimony whereof we affix our signatures in presence of two witnesses.

BURRELL A. KEELER. [L. S.]
ROLLIN D. FILDES. [L. S.]

Witnesses:
FRANCIS M. THOMPSON,
RUFUS K. TABOR.