W. F. SELLERS.

BOILER HEADER.

APPLICATION FILED MAY 28, 1909.

960,044.

Patented May 31, 1910.

Fig. 3.

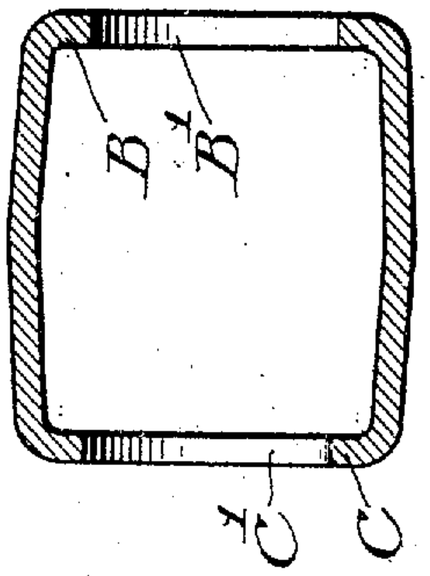


Fig. 4.

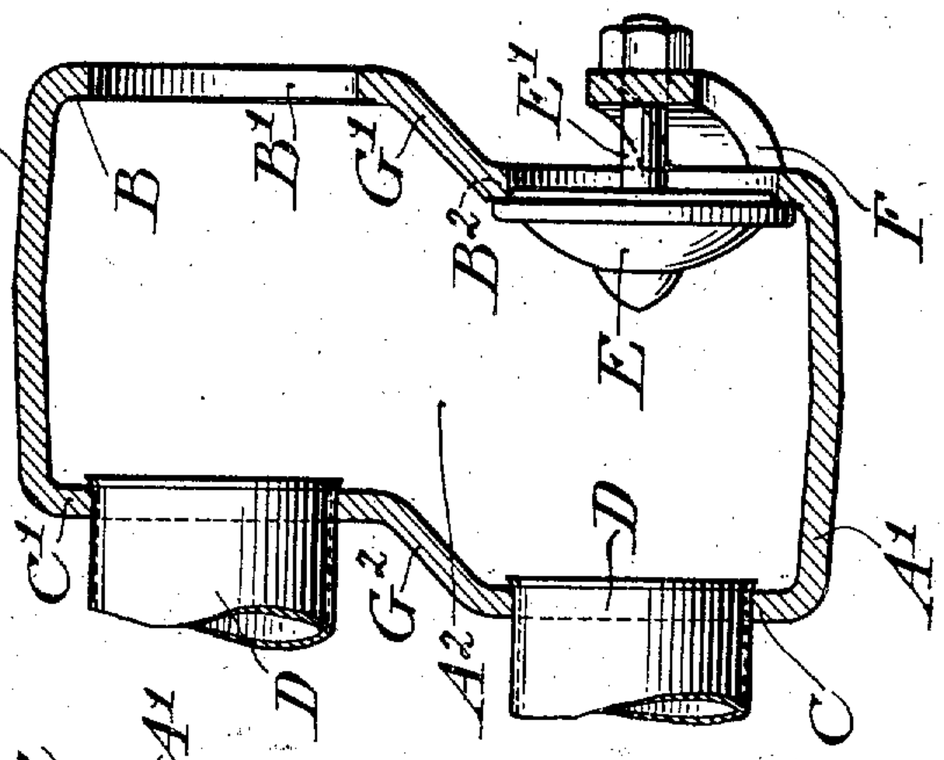


Fig. 2.

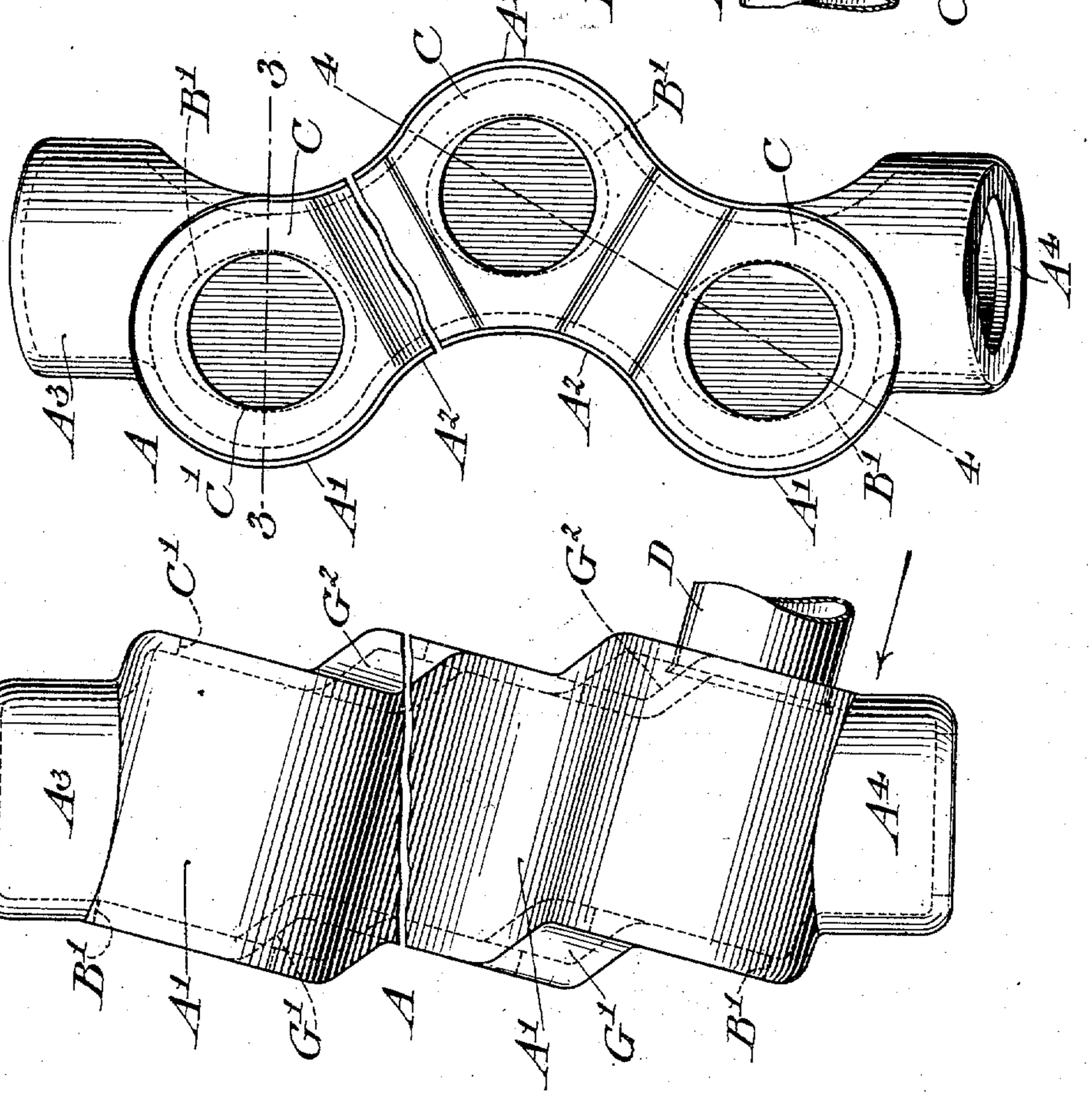


Fig. 1.




Witnesses:

Inventor:
William F. Sellers
by
Francis J. Chambers
his atty

# UNITED STATES PATENT OFFICE.

WILLIAM F. SELLERS, OF WILMINGTON, DELAWARE.

## BOILER-HEADER.

960,044. Specification of Letters Patent. Patented May 31, 1910.

Application filed May 28, 1909. Serial No. 498,805.

*To all whom it may concern.*

Be it known that I, WILLIAM F. SELLERS, a citizen of the United States, residing in Wilmington, in the county of Newcastle, in the State of Delaware, have invented a certain new and useful Improvement in Boiler-Headers, of which the following is a true and exact description, reference being had to the accompanying drawings, which form a part thereof.

The present invention relates to sinuous headers employed in sectional water tube boilers.

The object of my invention is the production of a cast metal vertical sinuous header for inclined tubular boilers which is so shaped that: *a*. The header can be readily cast and with the avoidance of destructive or weakening strains due to the casting operation. *b*. The header can be easily and cheaply machined in boring or reaming the tube holes, and internally facing the hand holes. *c*. The header will have the greatest strength to resist the boiler pressure which is compatible with its general contour. *d*. The header will have the greatest steam and water space compatible with its general contour and will have this space so shaped as to insure proper circulation. *e*. The header will have, at the same time, great accessibility and the most desirable means for closing its hand holes.

The various features of novelty which characterize the invention are pointed out with particularity in the claims annexed to and forming a part of this specification. For a better understanding of the invention, however, reference should be had to the accompanying drawings and descriptive matter in which I have illustrated and described one form of embodiment of the invention.

Of the drawings, Figure 1 is a side elevation of a header constructed in accordance with my invention. Fig. 2 is a rear end elevation of the header. Fig. 3 is a section on the line 3—3 of Fig. 2, and Fig. 4 is a section on the line 4—4 of Fig. 2.

In the drawings, A represents the header as a whole, which is in the form of a one piece cast metal shell, comprising parallel cylindrical portions A′, portions $A^2$ connecting adjacent pairs of cylindrical portions A′ and top and bottom portions $A^3$ and $A^4$. The cylindrical portions A′ have their axes parallel to the axes of the tubes of the boiler in which the header is to be used, and have end portions B and C perpendicular to their axes. The cylindrical portions A′ are arranged in a vertical series, but in order to give the desired sinuous contour to the header as a whole, alternate portions A′ having their axes in the same vertical plane are laterally displaced with respect to the intermediate portions A′ which also have their axes in a single vertical plane. The front and rear ends B and C of each cylindrical portion are formed one with a hand hole opening B′ in it and the other with a tube receiving opening C′. A boiler tube D is secured in each tube opening C′ as by expanding its end, as shown at the bottom of Fig. 1 and in Fig. 4. Preferably the hand hole cover is an internal cover E, as shown in Fig. 4, secured in place by the usual threaded stem E′ and external yoke F. Where an internal cover is employed, as shown, the hand hole is preferably made oval, as indicated by the dotted lines in Fig. 2, to facilitate the ready insertion and removal of the hand hole cover. In any event the tube opening C′ and hand hole B′ in each cylindrical portion A′ are preferably concentric or substantially so.

$B^2$ represents the seat faced off on the inside of each end C to form a bearing for the hand hole cover.

As the similar cylindrical portions A′ are inclined to the horizontal and are arranged in a vertical series, the upper end of each portion A′ overlaps, and the lower end of each portion is overlapped by, the corresponding ends of the adjacent portion A′ beneath it. I have found, however, that the difficulties in the casting operation due to this overlapping, and the impediment to the perfect circulation of steam and water in the header due to the same cause may be largely avoided by forming the connecting portions $A^2$ as shown, with parallel inclined end portions G′ and $G^2$, which connect the corresponding ends B, B and C, C, of the adjacent portions A′, and preferably by making the sides of the connecting portions $A^2$ concave as shown.

In Figs. 1 and 2 I have shown only three cylindrical portions A′, but I have indicated by the break that the header may contain more cylindrical portions than are shown, and in practice each header usually has from nine to fourteen cylindrical portions.

The tubes D may be readily anchored in

place, as the hand holes B′ are not only of ample size but are placed in the most advantageous position to facilitate the entrance of tools into the header for working on the tubes D secured in the corresponding tube holes C′, as well as for cleaning and repairing the header. Moreover, since the hand and tube holes B′ and C′ in each cylindrical portion A′ are concentric, the one may be faced and the other drilled or reamed by tools carried by a single tool spindle at one setting of the work relative to the tool spindle.

By shaping the cylindrical portions A′ and the connecting portions $A^2$ as described, all sharp corners in the casting are avoided, which facilitates the ready casting of the header and the avoidance of strains due to the casting operation, while at the same time the steam and water space in the header is the maximum obtainable with the general contour of the header, and there are no sharp bends or pockets which impede the proper circulation of the steam and water. The absence of sharp corners in the structure also insures the maximum strength to resist the boiler pressure obtainable with a header of this general contour. By reason of the shape given to the header, the manner in which the hand hole covers are supported and secured in place, and the very good joints between the tubes and the header obtainable by reason of the easy accessibility of the inserted ends of the tubes, I find it possible to make the header shell of uniform thickness at all points, and this is also an important factor in the avoidance of strains due to the casting operation, since much less trouble is caused by strains in castings of this type where the shell is of uniform thickness than where the shell is substantially thicker at some points than at others.

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

1. A vertical sinuous header for a sectional boiler with inclined water tubes, in the form of a one piece shell comprising a vertical series of cylindrical portions having their axes parallel to the water tubes, and arranged with alternate portions laterally displaced with respect to the intermediate portions, each cylindrical portion having ends perpendicular to the axis of the portion, with a tube opening in one end and a hand hole in the other end with an internal cover seat at the margin of the hand hole.

2. A vertical sinuous header for a sectional boiler with inclined water tubes, in the form of a one piece shell of substantially uniform thickness comprising a vertical series of cylindrical portions having their axes parallel to the water tubes, and arranged with alternate portions laterally displaced with respect to the intermediate portions, each cylindrical portion having ends perpendicular to the axis of the portion, with a tube opening in one end and a hand hole in the other end with an internal cover seat at the margin of the hand hole.

3. A vertical sinuous header for a sectional boiler with inclined water tubes, in the form of a one piece shell comprising a vertical series of cylindrical portions having their axes parallel to the water tubes, and arranged with alternate portions laterally displaced with respect to the intermediate portions, and connecting portions between each adjacent pair of cylindrical portions, each cylindrical portion having ends perpendicular to the axis of the portion, with a tube opening in one end and a hand hole in the other end, and each of said connecting portions having oblique end walls connecting the ends of the adjacent cylindrical portions.

4. A vertical sinuous header for a sectional boiler with inclined water tubes, in the form of a one piece shell comprising a vertical series of cylindrical portions having their axes parallel to the water tubes, and arranged with alternate portions laterally displaced with respect to the intermediate portions, and connecting portions between each adjacent pair of cylindrical portions, each cylindrical portion having ends perpendicular to the axis of the portion, with a tube opening in one end and a hand hole in the other end, and each of said connecting portions having oblique end walls connecting the ends of the adjacent cylindrical portions, and concave side walls connecting the bodies of the adjacent cylindrical portions.

5. A vertical sinuous header for a sectional boiler with inclined water tubes in the form of a one piece shell comprising a vertical series of cylindrical portions having their axes parallel to the water tubes and arranged with alternate portions laterally displaced with respect to the intermediate portions, and connecting portions between each adjacent pair of cylindrical portions, each cylindrical portion having ends perpendicular to the axis of the portion, with a tube opening in one end and a hand hole with an internal machined bearing at its margin in the other end, and each of said portions having oblique end walls connecting the ends of the adjacent cylindrical portions.

6. A vertical sinuous header for a sectional boiler with inclined water tubes, in the form of a one piece shell of substantially uniform thickness, comprising a vertical series of cylindrical portions having their axes parallel to the water tubes and being arranged with alternate portions laterally displaced with respect to the intermediate portions, and connecting portions between each adjacent pair of cylindrical portions, each cylindrical portion having ends perpendicular to the axis of the portion, with a tube opening in

one end and an oval hand hole and an internal cover bearing at the margin of said hole formed in the other end and concentric with the tube opening, and each of said connecting portions having parallel oblique end walls connecting the ends of the adjacent cylindrical portions and having concave side walls connecting the bodies of the adjacent cylindrical portions.

WM. F. SELLERS.

Witnesses:
ARNOLD KATZ,
D. STEWART.