No. 693,298. Patented Feb. 11, 1902.

G. W. MIDDLETON.

REMOVABLE BOILER FLUE.

(Application filed May 31, 1901.)

(No Model.)

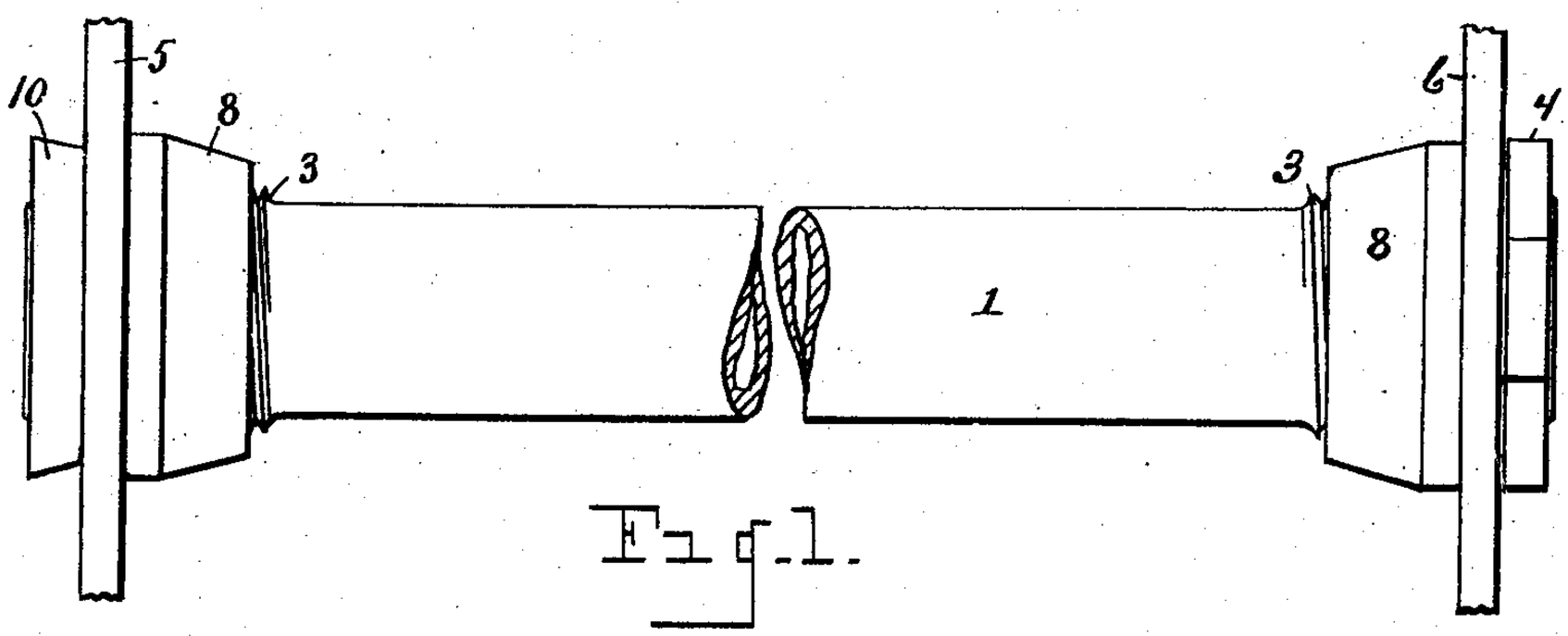

Fig. 1.

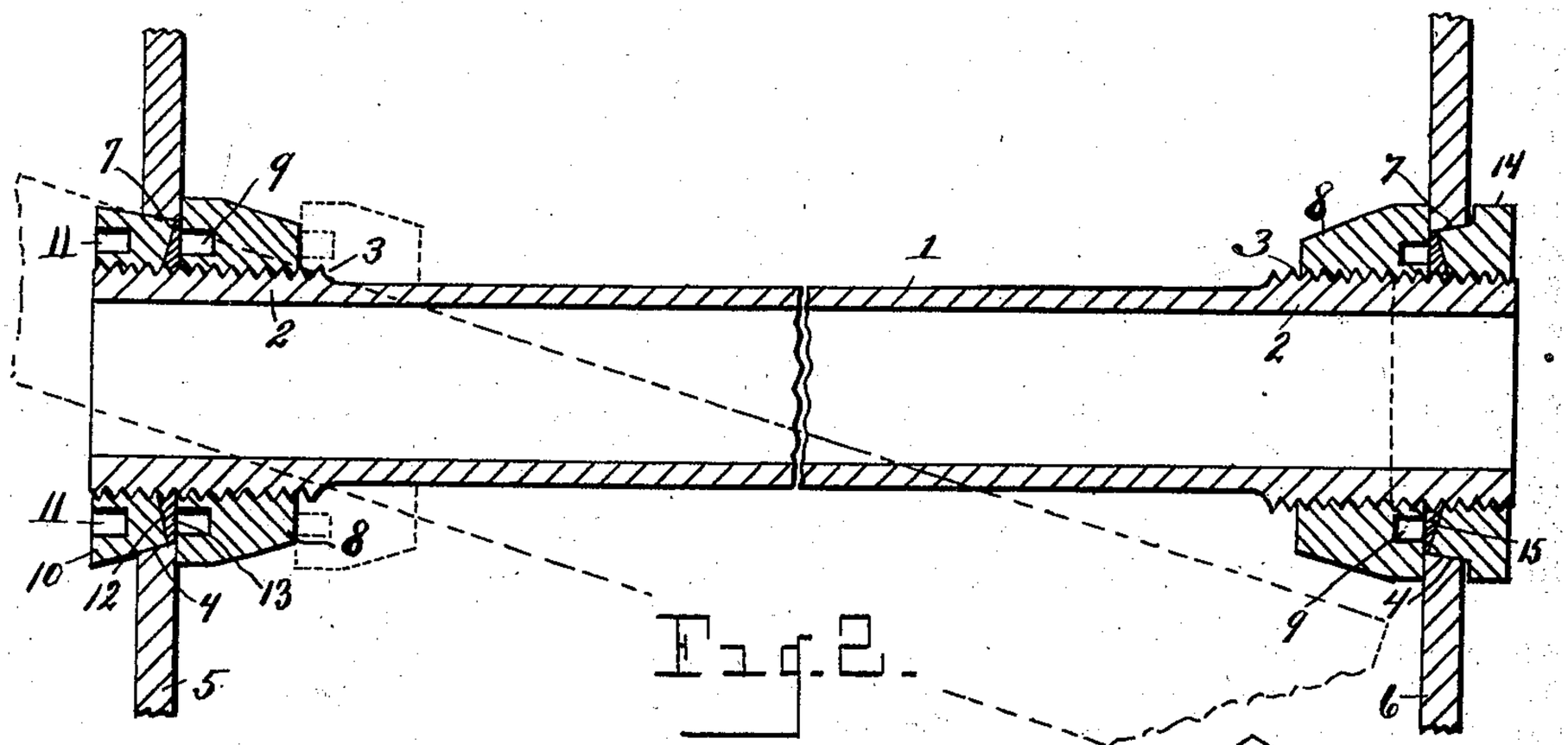

Fig. 2.

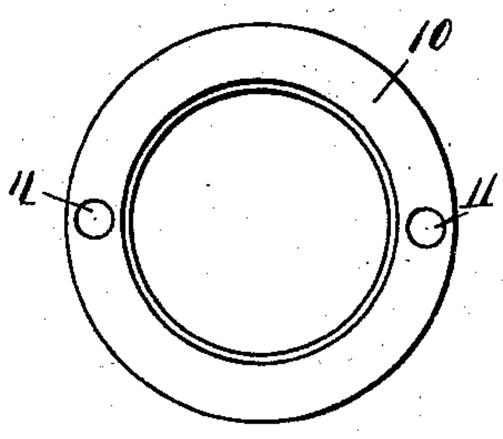

Fig. 3.

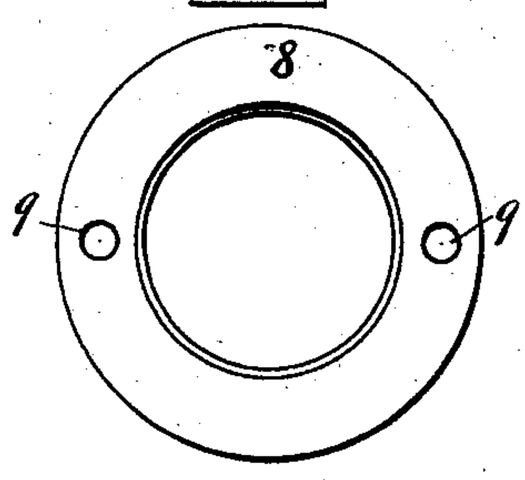

Fig. 5.

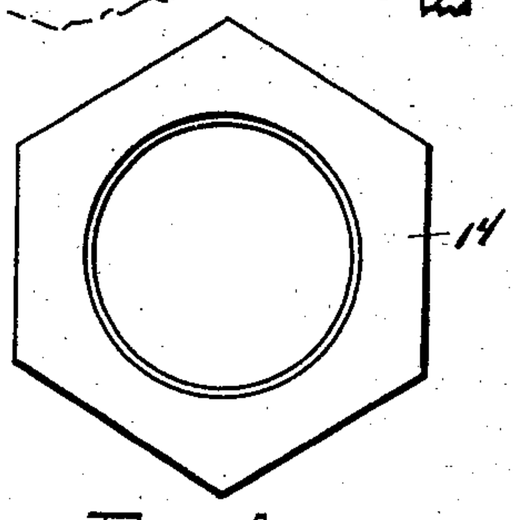

Fig. 4.

WITNESSES.

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REMOVABLE BOILER-FLUE.

SPECIFICATION forming part of Letters Patent No. 693,298, dated February 11, 1902.

Application filed May 31, 1901. Serial No. 62,457. (No model.)

To all whom it may concern:

Be it known that I, GEORGE W. MIDDLETON, a citizen of the United States, residing at Corunna, in the county of Shiawassee, State of Michigan, have invented certain new and useful Improvements in Removable Boiler-Flues; and I do 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, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

This invention relates to removable boiler-flues; and it consists in the construction and arrangement of parts hereinafter fully set forth, and pointed out particularly in the claims.

The objects of the invention are to provide for securing the flues of shell-boilers in the boiler-heads in such manner as to allow of the ready removal of the flues for the purpose of cleaning and to facilitate the replacing of the flues in the boiler after being cleaned.

A further object is to provide for making a steam-tight joint between the ends of the flues and the boiler-head to prevent any escape of steam.

The above objects are attained by the arrangement illustrated in the accompanying drawings, in which—

Figure 1 is an elevation showing my improved flue secured in the heads of the boiler, portions of which are broken away. Fig. 2 is a longitudinal sectional view through the flue and boiler-heads, as well as the coupling parts. Fig. 3 is an elevation of one of the burs or nuts adapted to screw upon the outer end of the flue. Fig. 4 is an elevation of the hectagon nut employed upon the opposite end of the flue. Fig. 5 is an elevation of the collar, screwed upon the threaded end of the flue and adapted to bear against the inner face of the boiler-head.

Referring to the characters of reference, 1 designates a boiler-flue, which is upset at each end, as at 2, whereby provision is made for cutting the threads 3 upon the ends of the flue. The openings 4 through the heads 5 and 6 of the boiler are of larger diameter than the flues, and the margins of said openings are beveled outwardly, as shown at 7.

Screwed upon the threads at each end of the flue is a collar 8, of such thickness as to afford a bearing against the inner face of the boiler-head around the flue-opening therethrough. These collars 8 are provided with diametrically-opposed recesses 9 in the face thereof for the reception of a spanner-wrench, through the medium of which said collars may be turned to adjust them upon the threaded ends of the flue. These recesses 9 in the collars 8 stand in line with the openings of the boiler-head, so that by removing the exterior nuts said collars may be turned from the outside of the boiler.

Upon the fire end of the flues is an annular nut 10, having recesses 11 in its face for the application of a spanner-wrench and being of conical shape to correspond with the beveled aperture in the boiler-head. The inner face of the nut 10 is concaved or dished at 12, so that when screwed forcibly against a malleable washer or gasket 13, placed around the end of the flue and against the face of the collar 8, said gasket will be crowded into the thread of the flue to prevent any escape of steam around said thread, while the nut 10 will make a steam-tight joint between its conical sides and the beveled aperture in the boiler-head. The opposite end of the flue is in a like manner provided with a conical nut 14, adapted to screw onto the threaded end of the flue and make a closure against the beveled opening of the boiler-head, while the inner face of said nut is provided with a slight concavity calculated to force the malleable gasket 15 into the threads of the flue to prevent the passage of steam along said threads. The collar 8 at this end of the flue is caused to bear against the boiler-head around the flue-opening, as at the opposite end, so as to enable the nut 14 to be forced into place.

With the arrangement above described the flues may be removed from the boiler by removing one of the nuts and slacking the collar 8 away from the inner face of the boiler-head, as shown by dotted lines in Fig. 2. The nut on the opposite end of the flue is then removed, when said flue may be drawn longi-

tudinally and one end dropped down within the boiler, where it can be removed through the manhole in a manner well understood in the art. By this means all the flues in the boiler may be quickly removed and thoroughly cleaned of any corrosion or scale upon the exterior, as well as the interior thereof, whereby the efficiency of the boiler may be improved and a very material saving in fuel effected.

Having thus fully set forth my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a removable boiler-flue, the combination with the heads of the boiler having apertures therethrough of greater diameter than the flue, which apertures are provided with an outwardly-beveled margin, the flue upset and threaded at its opposite ends, collars screwed upon the flue and adapted to bear against the inner face of the boiler-heads around the flue-opening and conical nuts adapted to screw onto the outer threaded ends of the flue and engage in the beveled openings in the boiler-head.

2. In a boiler-flue, the combination of the boiler-heads having apertures therein to receive the ends of the flue, which apertures are of larger diameter than the flue, a flue threaded at both ends, a collar on each end of the flue adapted to screw longitudinally upon the threaded portion thereof and bear against the inner face of the boiler-head around the flue-opening, nuts upon the outer ends of said flue adapted to screw into the opening of the boiler-head around the flue, said nuts having a concave in the face thereof around the flue-opening, and a compressible gasket, or washer, lying in the concave in said nuts and surrounding each of the threaded ends of the flue and adapted to be compressed by said nuts.

3. The combination of the boiler-heads, having outwardly-beveled apertures therethrough, a flue threaded at its opposite ends and adapted to project through said apertures, adjustable collars upon the flue within the boiler and adapted to bear against the inner face of the boiler-heads around the flue-opening and conical nuts screwed onto the outer ends of the flue and entering and engaging the beveled wall of the opening in the boiler-head therearound.

In testimony whereof I sign this specification in the presence of two witnesses.

GEORGE W. MIDDLETON.

Witnesses:
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