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A. J. ERVIN & J. R. WALKER.

BOILER TUBE FASTENER.

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Fig. 1-

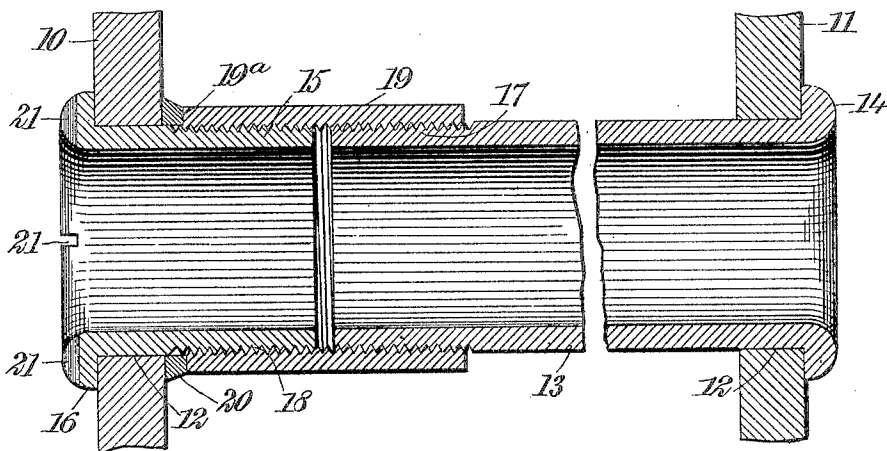


Fig. 2-

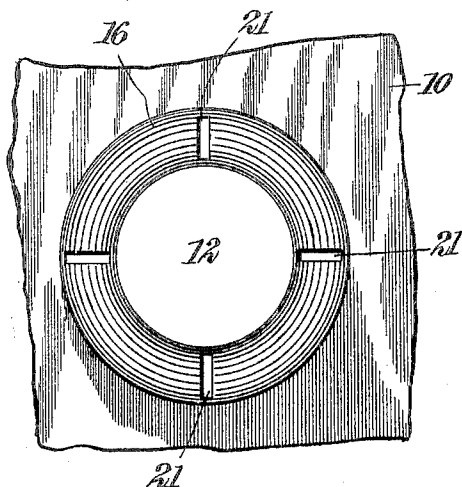


Fig. 3-

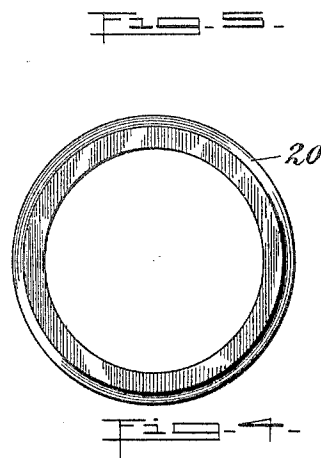
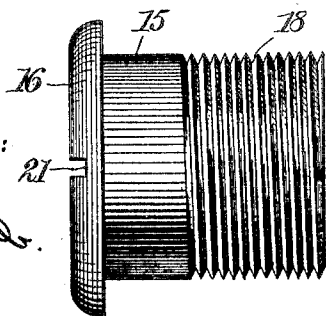


Fig. 4-



WITNESSES:
C. A. Jones.
J. H. Cobb.

INVENTORS
Arthur J. Ervin
James R. Walker
BY
Mumme
ATTORNEYS

UNITED STATES PATENT OFFICE.

ARTHUR JIMASON ERVIN AND JAMES RAYMOND WALKER, OF SOUTH CUMBERLAND, MARYLAND.

BOILER-TUBE FASTENER.

No. 804,590.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that we, ARTHUR JIMASON ERVIN and JAMES RAYMOND WALKER, citizens of the United States, and residents of South Cumberland, in the county of Allegany and State of Maryland, have invented a new and Improved Boiler-Tube Fastener, of which the following is a full, clear, and exact description.

Our invention relates to means for fastening the tubes or flues of boilers to the tube-sheets, having for its principal objects the provision of a simple and secure fastening device.

With these and other objects in view, which will hereinafter appear, our invention consists in the various features which will now be described and more particularly claimed.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a broken central vertical longitudinal section through a tube and the cooperating tube-sheets secured together by one form of our invention. Fig. 2 is an end elevation looking from the left in Fig. 1. Fig. 3 is a side elevation of the nipple, and Figs. 4 and 5 are respectively side and edge elevations of the gasket.

10 designates the tube-sheet at the furnace end of the boiler and 11 that opposite. These are provided with the usual aligned openings 12 which may be of equal diameter and are cylindrical, so that the sheets may be weakened as little as possible. Through the opening in the sheet 11 extends a tube 13, which is provided with a rolled end or enlargement 14, the inner side of which contacts with the outside of the sheet. Through the opposite opening extends a nipple 15, formed of a section of the tube, or at least being of the same diameter, this nipple also having a rolled enlargement or head 16 located outside the sheet 10, with its inner surface contacting with said sheet over a considerable area, as does the enlargement 14. The tube is threaded at its end 17, and the nipple has an adjacent and oppositely-inclined thread 18, which extends back substantially to the tube-sheet. These threads are united by a similarly-threaded sleeve 19, the end 19^a of which may coact with the inner side of the sheet 10, there being, however, preferably, interposed a gasket 20, which may be of copper or other suitable material. The head 16 may be provided with flattened en-

gaging surfaces, which are here shown as slots 21, adapted to receive a wrench. The rolled ends of both the tube and nipple may be formed hot in the process of manufacture.

In assembling the parts the tube is inserted through the opening in the sheet 11 until its head contacts therewith. The sleeve is then screwed upon the thread 17 and the nipple inserted through the opening in the opposite sheet, the gasket being slipped about it. The sleeve is now brought into coaction with the thread 18 and the nipple turned by the engagement of a suitable tool with its slots 21 to force the end 19^a of the sleeve against the gasket, which in turn presses said gasket against the sheet and the under side of the head 16 against the outside of the sheet, thus forming a steam-tight joint at both surfaces. The turning of the nipple at the same time draws the opposite head 14 against the outside of the sheet 11 and also produces here a tight joint. The arrangement of the parts is such that their contraction prevents leakage, but without the introduction of injurious stress. If by any chance a leak occurs, it may be readily remedied by a further turning of the nipple.

It will be seen that with this fastening it is unnecessary to make any change in the tube-sheets as ordinarily arranged and that the same tubes may also be used, it being only necessary to furnish the separate section or nipple. The flues are made complete ready to install, and the necessity of rolling the ends cold (a process which reduces the strength of the metal) is eliminated. Each tube acts as a stay, drawing the opposite sheets toward one another and preventing the loosening of the tubes, which so frequently occurs with the ordinary rolled-end type. When these tubes are used as flues, (which is the customary practice,) the threading upon all the elements and the gasket are upon the water side of the sheet and are protected from flame, thus avoiding undue expansion and contraction. It should be further noted that either end of the flue may be removed separately without interfering with the other parts.

As the chief liability to leakage occurs at the furnace or fire-box end, our improved fastening has been illustrated upon this portion only; but it will be obvious that, if it is desired, it may be applied to either or both ends.

Having thus described our invention, we

claim as new and desire to secure by Letters Patent—

5 The combination with opposite boiler-tube sheets provided with alined cylindrical openings, of a tube extending through the opening in one sheet and toward the other, a nipple extending through the sheet-opening opposite the tube, both the tube and nipple having enlarged ends contacting with the outside
10 of the sheets over a considerable area and being provided with oppositely-inclined threads upon their adjacent ends, a sleeve engaging

both threads and moving into coöperation with the tube-sheet receiving the nipple upon making up the joint, and a gasket contacting 15 with the sleeve and said sheet.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

ARTHUR JIMASON ERVIN.
JAMES RAYMOND WALKER.

Witnesses:

J. J. STAPLETON,
JOHN B. PITZER.