No. 891,139. PATENTED JUNE 16, 1908.

L. BORNEMAN.

BOILER STAY BOLT.

APPLICATION FILED JULY 9, 1907.

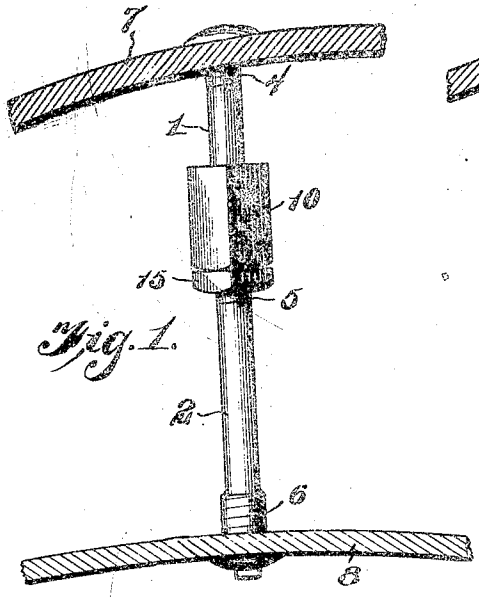


Fig. 1.

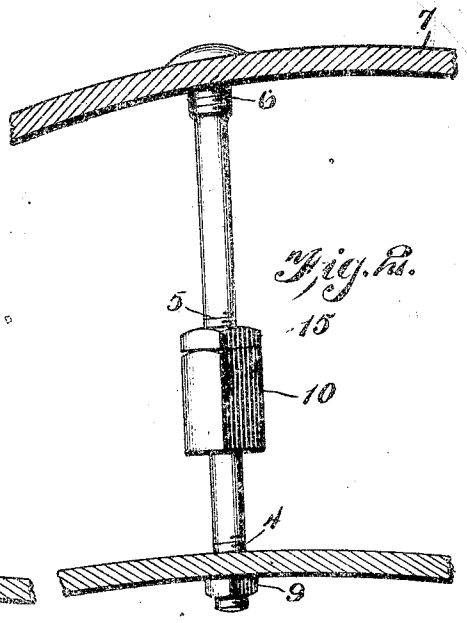


Fig. 2.

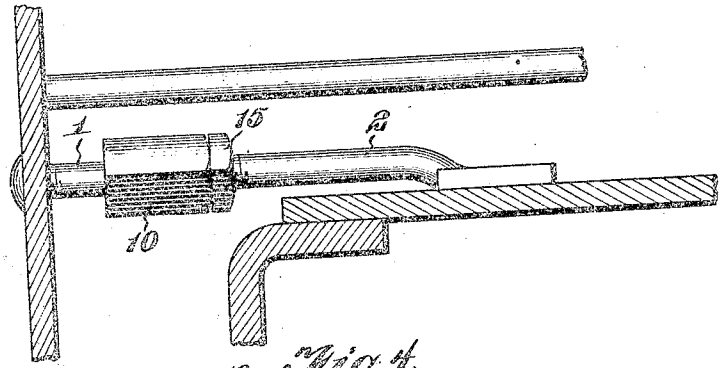


Fig. 3.

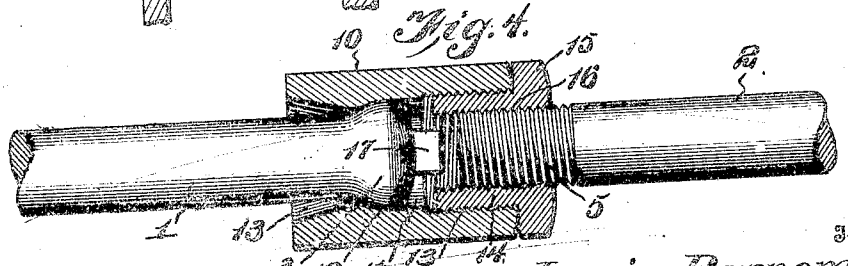


Fig. 4.

Witnesses

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UNITED STATES PATENT OFFICE.

LEWIS BORNEMAN, OF DENISON, TEXAS.

BOILER STAY-BOLT.

No. 891,139. Specification of Letters Patent. Patented June 16, 1908.

Application filed July 9, 1907. Serial No. 382,953.

To all whom it may concern:

Be it known that I, LEWIS BORNEMAN, a citizen of the United States, residing at Denison, in the county of Grayson and State of Texas, have invented new and useful Improvements in Boiler Stay-Bolts, of which the following is a specification.

This invention relates to improvements in flexible stay-bolts or braces for boilers, and particularly to that class of laterally yielding stay-bolts or braces employed for connecting and bracing sheets of locomotive and other steam boilers against the internal steam-pressure while permitting relative movement of the sheets and flexibility of the bolts or braces to compensate for unequal expansion and contraction, vibration, etc., of the parts, under which the bolts are subjected to a shear strain.

The object of the invention is to provide a stay-bolt of this character which is simple of construction, efficient in use, comparatively inexpensive of production, adapted to be conveniently applied without varying the usual construction of boiler sheets, and which will permit the inner sheet to be removed for renewal or repairs without disturbing the outer sheet.

With these and other objects in view, the invention consists of the features of construction, combination and arrangement of parts hereinafter fully described and claimed, reference being had to the accompanying drawing, in which:—

Figure 1 is a sectional elevation showing the application of the stay-bolt to the outer and inner sheets of a boiler. Fig. 2 is a similar view, showing a slight modification. Fig. 3 is a view showing the adaption of the invention as a stay-bolt or brace for flue-sheets. Fig. 4 is a view showing in section the ball and socket connection between the bolt or brace sections.

In carrying my invention into practice, I provide a stay-bolt or brace comprising two members or sections 1 and 2, which may be of the same length or vary in length as desired. The section 1 is provided at one end with a partially spherical head 3 and at its other end with a threaded portion 4. The section 2 is threaded at both ends, as indicated, respectively, at 5 and 6, and the threaded outer ends 4 and 6 of the two sections are adapted to engage with correspondingly screw-threaded openings in the boiler sheets 7 and 8, which may constitute outer and inner sheets, representing in Figs. 1 and 2 the roof and crown sheets and in Fig. 3 the flue sheets of the boiler. It will be understood that after the threaded outer ends of the bolt sections are screwed into the boiler sheets, beyond which they project, the projecting ends, which are angular in form or otherwise adapted for the application of a wrench or other turning tool, are upset or riveted in the usual manner to fasten the same to the sheets and form steam tight joints; but, as shown in Fig. 2, the projecting end of the bolt section 2 may be formed to receive an ordinary securing nut 9, which may be employed when sufficient space for the reception of the nut is afforded and a riveting connection is not desired. In Fig. 1 the threaded portion of the bolt section 2 is enlarged and may be of tapering formation for engagement with a tapered opening in the boiler sheet, and these and any other suitable form or mode of connecting the ends of the bolt sections with the boiler sheets may be employed.

The inner ends of the bolt sections 1 and 2 are flexibly connected by a coupling comprising a socket 10 having a central chamber 11 and a flaring wall 12 to receive and conform to the contour of the head 3, said chamber being internally threaded at one end, as indicated at 13, and formed with a flaring opening 13 at its opposite end to permit the shank of the bolt to have free lateral movement to insure flexibility of the bolt in the relative working of the parts under expansion and contraction and vibration during the running of the locomotive. A screw-cap or nut 14 is externally threaded to screw into the threaded portion 13 of the socket and is provided with an angular flange 15 for the application of a wrench or other tool in turning it into and out of the socket. The cap or nut is also formed with a threaded passage 16 to receive and engage the threaded portion 5 of the bolt section 2, whereby the two bolt sections may be adjustably and flexibly coupled together. If desired an angular lug 17 may be formed upon the head 3 of the bolt section 1 to allow the latter to be applied from the inside of the boiler.

The construction shown in Fig. 3 is identical with that disclosed in Figs. 1, 2 and 4 except that the bolt sections are slightly varied in shape and size to adapt the same for connection with the flue-sheets to serve

as a stay-connection between said sheets. The socket 10 may be in every case externally of angular form for the application of the wrench thereto to facilitate the connection and disconnection or the parts.

It will be apparent from the foregoing description that the construction shown and described provides a stay-bolt or brace which is not only simple of construction, and may therefore, be produced at a comparatively low cost, but which will allow ample relative movement of the parts under vibration or expansion and contraction and thus prevent injury to the bolts and the boiler-sheets. The construction and mode of connecting the bolt sections also permits effective adjustment thereof to connect the boiler sheets as tightly as desired.

Heretofore it has been customary to employ a single-piece-bolt extending the full distance between the sheets connected thereby, requiring the use in some cases of very long bolts with material disadvantages. When either boiler-sheet of the two connected by the bolt becomes burned or otherwise injured, it is necessary when a single-piece-bolt is used to drill both ends of the bolt out of the sheets, thus enlarging the openings in the uninjured sheet with known objections. Furthermore, the required amount of flexibility can not be obtained with single-piece-bolts, even when tapered to allow greater flexibility, and under the strain falling thereon, such bolts are liable to be fractured.

My invention obviates all these objections and secures additional advantages in allowing greater flexibility and saving time and labor in constructing and repairing the boiler. Either bolt section may be applied from the inner or outer side of the boiler, and should an accident occur to the inner sheet of such a nature as to require its removal it is simply necessary, with my construction, to remove only the inner bolt sections 2 and apply a corresponding new section to the new sheet for connection with the bolt sections 1, which may remain in place during the course of repairs. The outer bolt sections 1 may be removed in like manner independently of the inner bolt sections when the outer sheet is injured, with a consequent saving of time and labor in making the necessary repairs and without the necessity of removing and discarding the entire bolt. Furthermore, the construction described adapts the bolt to be applied to boiler-sheets as ordinarily constructed and without the necessity of enlarging the openings in said sheets or modifying them in any other manner.

Having thus described the invention, what I claim, is:—

As a new and improved article of manufacture, a boiler stay-bolt or brace comprising two bolt-like sections having proximate coupling ends, the coupling end of one section being formed with an integral flaring head and the coupling end of the other section provided with screw-threads, a coupling socket receiving said head, said socket being internally screw-threaded at one end and provided at its opposite end with a flaring wall in bearing contact with the flaring surface of the head and having a flaring entrance leading through said wall for the said headed section, said section being adapted to have free movement in said flaring entrance, whereby the sections are adapted to have relative universal play, and a hollow internally and externally threaded nut receiving the threaded end of the other section and engaging the threaded portion of the socket, substantially as described.

In testimony whereof, I affix my signature in presence of two witnesses.

LEWIS BORNEMAN.

Witnesses:
GEO. F. FRENCH,
W. H. HUGHES.