No. 663,464.

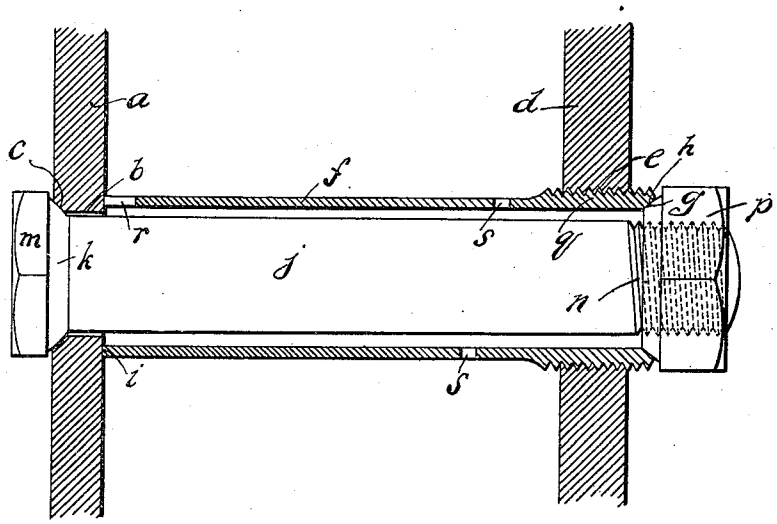
Patented Dec. 11, 1900.

S. F. PRINCE, JR.

BOILER STAY.

(Application filed Apr. 5, 1900.)

(No Model.)



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UNITED STATES PATENT OFFICE.

SAMUEL F. PRINCE, JR., OF READING, PENNSYLVANIA.

BOILER-STAY.

SPECIFICATION forming part of Letters Patent No. 663,464, dated December 11, 1900.

Application filed April 5, 1900. Serial No. 11,676. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL F. PRINCE, Jr., a citizen of the United States of America, and a resident of Reading, in the county of Berks and State of Pennsylvania, have invented certain new and useful Improvements in Boiler-Stays, of which the following is a specification.

My invention relates to improved means for staying the inner and outer sheets of a steam-boiler.

The main objects of the invention are to avoid the undue strains and resulting breakage ordinarily occasioned by the unequal expansion of said sheets and to provide for the easy application and maintenance of the stays.

The invention is fully described in connection with the accompanying drawing, and the novel features are pointed out in the claims.

The drawing is a sectional view of a portion of the inner and outer sheets of a boiler, showing the application of my invention thereto.

a represents the inner or fire-box sheet, and *d* the outer sheet of a boiler. The former is provided with a series of holes *b* of a size adapted to permit the free passage of the body of a stay-bolt *j*, the head *m* of which, as shown, is provided with a conical seat *k*, adapted to form an adjustable or ball joint in the countersunk portion *c* of the hole *b*, while its outer end *n* is screw-threaded to receive a nut *p*. On line with the hole *b* is another hole *e* in the outer sheet, which latter hole, as shown, is of larger diameter and screw-threaded to engage the enlarged externally-threaded end *g* of a tube *f*. This tube is of somewhat larger diameter internally than the stay-bolt and is inserted through the hole in the outer sheet and screwed into the latter until its end *i* is in contact with the inner face of the inner sheet *a*, thus forming a fixed though readily-removable sleeve loosely inclosing the body of the stay-bolt. The screw-threaded head *q* of this sleeve preferably extends slightly beyond the outer sheet *d* and is countersunk at *h* to form, in connection with the conical base *g* of the nut, an adjustable joint similar to that between the head of the bolt and the inner sheet. The sleeve *f* is thus removably secured to and carried by one sheet, but is without fixed connection with the other and serves as a fixed distance-piece, which permits of any desired staying tension being brought upon the stay-bolt, while itself practically free from either tensile or transverse strain. The end *i* of the sleeve is not intended to form a water-tight seat against the sheet *a*, as I prefer to permit the water to circulate in the annular space between the sleeve and the bolt, and for this purpose provide openings thereto, as *r* and *s*, adjacent to each sheet, so that when the stay-bolts are in vertical position said annular space may be in free communication with both the water and steam space of the boiler, and thus maintain an equilibrium. The countersunk seats for the bolt-head and nut form water-tight joints, permitting the relative movement resulting from uneven expansion and contraction without producing any undue strains. The drawing up of the nut *p* in its conical seat in the end of the sleeve tends to slightly expand the latter, and thus insure its water-tight engagement in the threaded hole *e*.

The advantages of my construction in avoiding at the same time unnecessary weakening of the stay-bolt and undue strains and deteriorating action of the water thereon, as well as the convenience and comparative economy of construction and application, will be readily understood by those acquainted with the art to which my invention relates.

What I claim is—

1. The combination with the inner and outer sheets of a steam-boiler, of a sleeve between said sheets, a stay-bolt having a body passing loosely through said sleeve and the sheets and a head with a ball-joint seat directly in one of the latter, and a nut on said bolt having a ball-joint seat substantially as and for the purpose set forth.

2. The combination with the inner and outer sheets of a steam-boiler, of a sleeve between said sheets having one end in engagement with one of said sheets and its opposite end in contact with the opposite sheet, a stay-bolt passing through said sleeve and the sheets, and a nut, substantially as and for the purpose set forth.

3. The combination with the inner and outer sheets of a steam-boiler, of a sleeve between said sheets having one end in engagement with one of said sheets and its opposite

end in contact with the opposite sheet, a stay-bolt passing through said sleeve and the sheets, and a nut; said nut and the head of the bolt having ball-joint seats on the screw end of said sleeve and in the opening through the opposite sheet respectively, substantially as and for the purpose set forth.

Signed by me at Reading, Pennsylvania, this 2d day of April, 1900.

SAMUEL F. PRINCE, JR.

Witnesses:
W. G. STEWART,
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