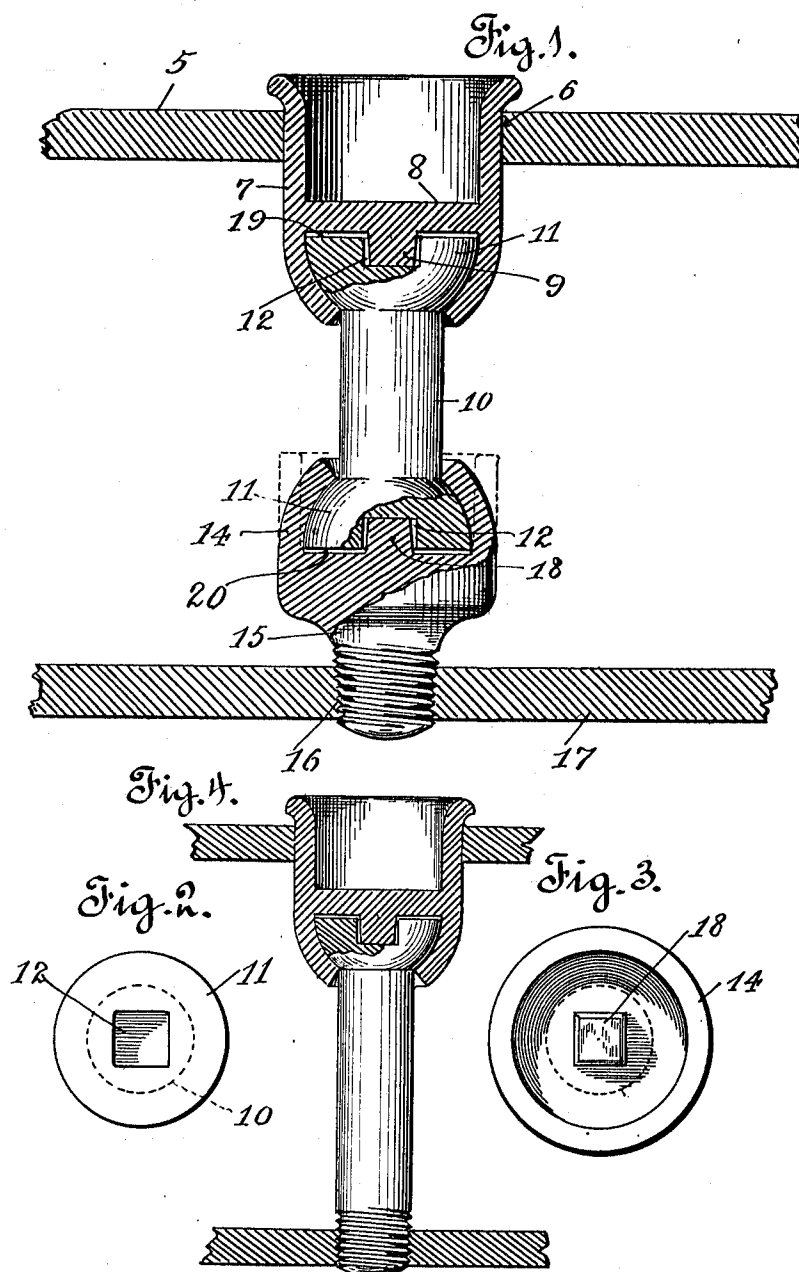


E. W. CLARK.
STAY BOLT.
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EDWARD W. CLARK, OF LOS ANGELES, CALIFORNIA.

STAY-BOLT.

1,003,705.

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To all whom it may concern:

Be it known that I, EDWARD W. CLARK, a citizen of the United States, residing in the city of Los Angeles, county of Los Angeles, State of California, have invented new and useful Improvements in Stay-Bolts, of which the following is a specification.

My invention relates to a flexible stay-bolt for securing the fire box of a boiler to the head or shell thereof; and the object thereof is to provide a flexible stay-bolt which can be quickly and accurately secured in place, and which will make steam tight joints and at the same time allow a slight vibration between the parts without undue strain on any of the parts; a further object is to produce a flexible stay-bolt which may be positioned for use when the holes in the fire box and shell of the boiler are not in perfect alinement. I accomplish these objects by the stay-bolt described herein and illustrated in the accompanying drawings forming a part hereof in which:

Figure 1 is a side elevation of my stay-bolt, partly in section, in place in a fragment of the fire box wall and a fragment of the boiler head. Fig. 2 is an end view of the shaft of my improved bolt detached from the thimbles. Fig. 3 is an end elevation of a thimble before being swaged upon the head of the shaft, viewed from the end showing the lug which prevents the rotation of the thimble on the shaft after the thimble is swaged thereon. Fig. 4 is a modified form of stay-bolt.

In the drawings 5 is the outer shell or boiler head, which is provided with the necessary perforations 6 for the reception of the outer thimbles 7 which are swaged therein in the usual well known manner. These outer thimbles preferably consist of a tube which is provided with a partition 8, which divides the tube into two parts. Upon one side of the partition is an angular shaped lug 9 which is preferably in shape, the frustum of a pyramid.

A connecting shaft 10 has semi-globular heads 11 provided with angular shaped sockets 12 into which the partition lug is received to prevent the rotation of one part in the other. In the drawings these sockets are square. Both ends or heads of the shaft are finished alike. The inner thimble consists of a tube 14, which has a closed and reduced inner end 15 which is circular and externally screw threaded, and when posi-

tioned for use, screws into apertures 16 in the fire box wall 17. The inner thimbles are provided with lugs 18 of the same form as the lugs of the outer thimble, which enter like recesses in the ends of the shaft. The inner and outer thimbles are swaged upon the heads of the shaft as shown in Fig. 1, so as to leave a small space between the partitions of the thimbles and the heads of the shaft as shown at 19 and 20 in Fig. 1. After the thimbles have been swaged upon the heads of the shaft, the completed stay-bolt is partly passed into an aperture in the outer shell or head and screwed into an aperture in the fire box, appropriate tools being used for that purpose. After the inner thimble is screwed to place the outer thimble is swaged at its outer end to secure it in the head or shell of the boiler in the usual well known manner.

By this construction it will be seen that the fire box may have considerable vibration without straining the connection between the thimbles and the shells, as the semi-globular head allows the thimbles to rotate slightly thereon.

It will also be observed that should the holes in the boiler head or shell and in the fire box be slightly out of alinement the inner thimble can be screwed into place, notwithstanding such want of alinement.

It will also be observed that this form of stay-bolt may be used where the boiler head and fire box shell are not parallel with each other, and still permit the holes for the thimbles to be bored through the respective parts at right angles to the faces or planes of the same.

If desired the inner thimbles can be of the same form as the outer one and can be secured by swaging in the same manner. Any angular shaped lug and depression which will keep the shaft from turning in the thimble may be used instead of the forms shown and any other form of head for the shaft which will permit of oscillation when in use, may be used but I prefer the semi-globular form as it is the best.

It will be observed that the partition in the outer thimble makes the joint between it and the shaft absolutely tight without the use of calking or washers.

In Fig. 4 I have shown a modification of my preferred form of bolt. In this form the shaft 10 has only one enlarged end 11 which is preferably semi-cylindrical and

only one thimble 6, which is the outer thimble, is used. The inner end 22 of the shaft is tapered and threaded and screws into a taper threaded hole 23 in the fire box wall 17, thereby making a steam tight joint. The outer end of the shaft and the outer thimble are in all respects the same as in my preferred construction. In the use of this bolt it will be observed that there is only half as much vibration provided for between the parts as in my preferred form; but where the distance between the fire box wall and the outer shell is short or where cheapness of construction is desirable this modification may be used.

Having described my invention what I claim is:—

1. A flexible stay-bolt comprising a central shaft having semi-globular heads at the ends thereof, said heads having angular recesses therein; an outer thimble having a partition therein swaged upon one of the heads of said shaft, said partition having an angularly formed lug projecting into the recess in the head; an inner thimble swaged upon the other head of said shaft, said thimble having an angular lug projecting into

the depression in the head of the shaft, and having a reduced threaded inner end.

2. A flexible stay-bolt comprising a central shaft having enlarged ends; and thimbles mounted upon said enlarged ends by swaging, and adapted to oscillate, but not rotate thereon, said thimbles being adapted to be secured in the respective parts united by the bolt.

3. A stay bolt composed of two sections connected together to prevent independent rotary movement, one of said sections consisting of a bolt having a head at one end and being screw threaded at the other end, and the other section consisting of a tubular member having a partition intermediate its ends, one of the ends of said tubular member being swaged around the head of the other member.

In witness that I claim the foregoing I have hereunto subscribed my name this 4th day of October, 1910.

E. W. CLARK.

Witnesses:

G. E. HARPHAM,
C. M. AUSTIN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."