

No. 757,973.

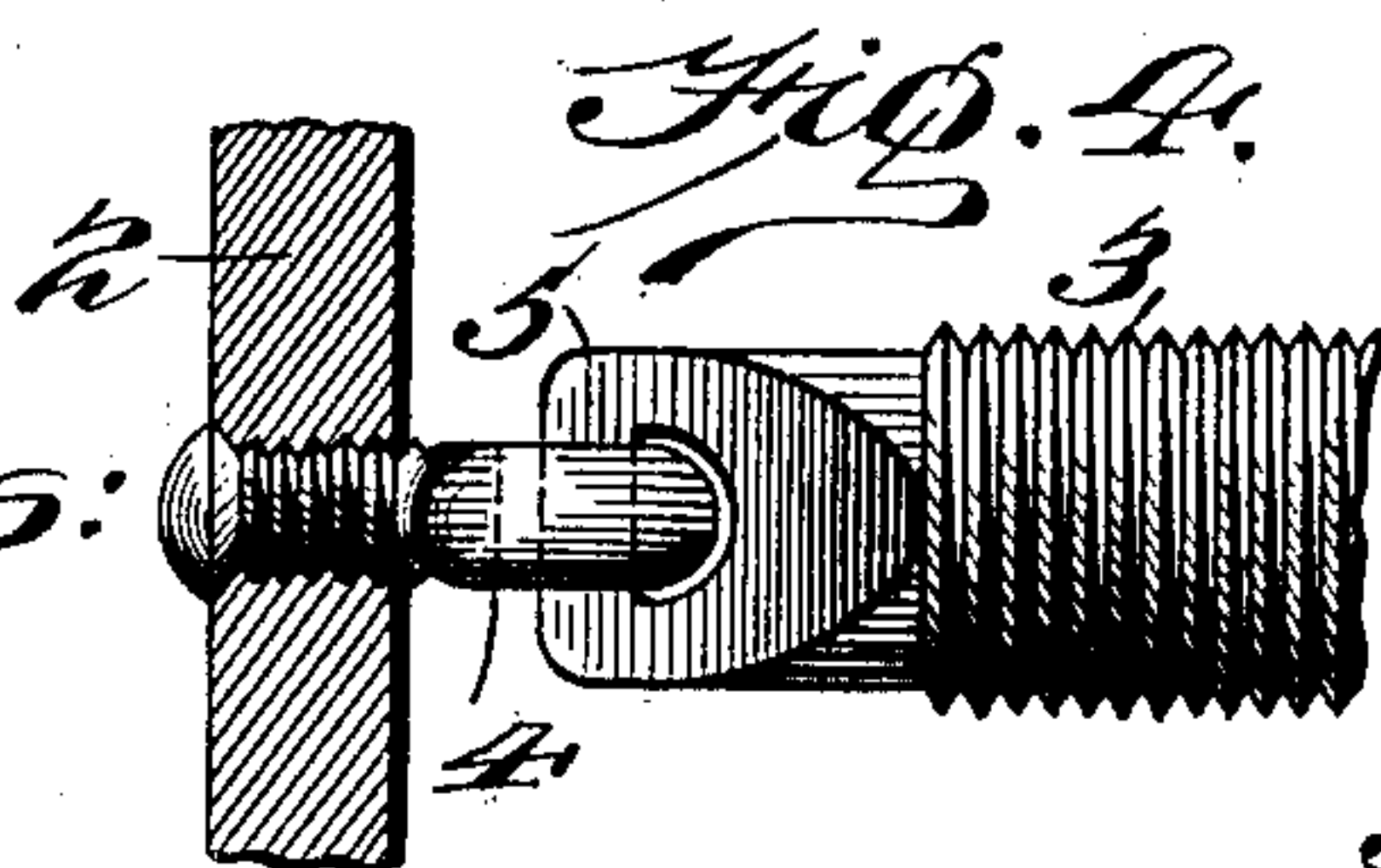
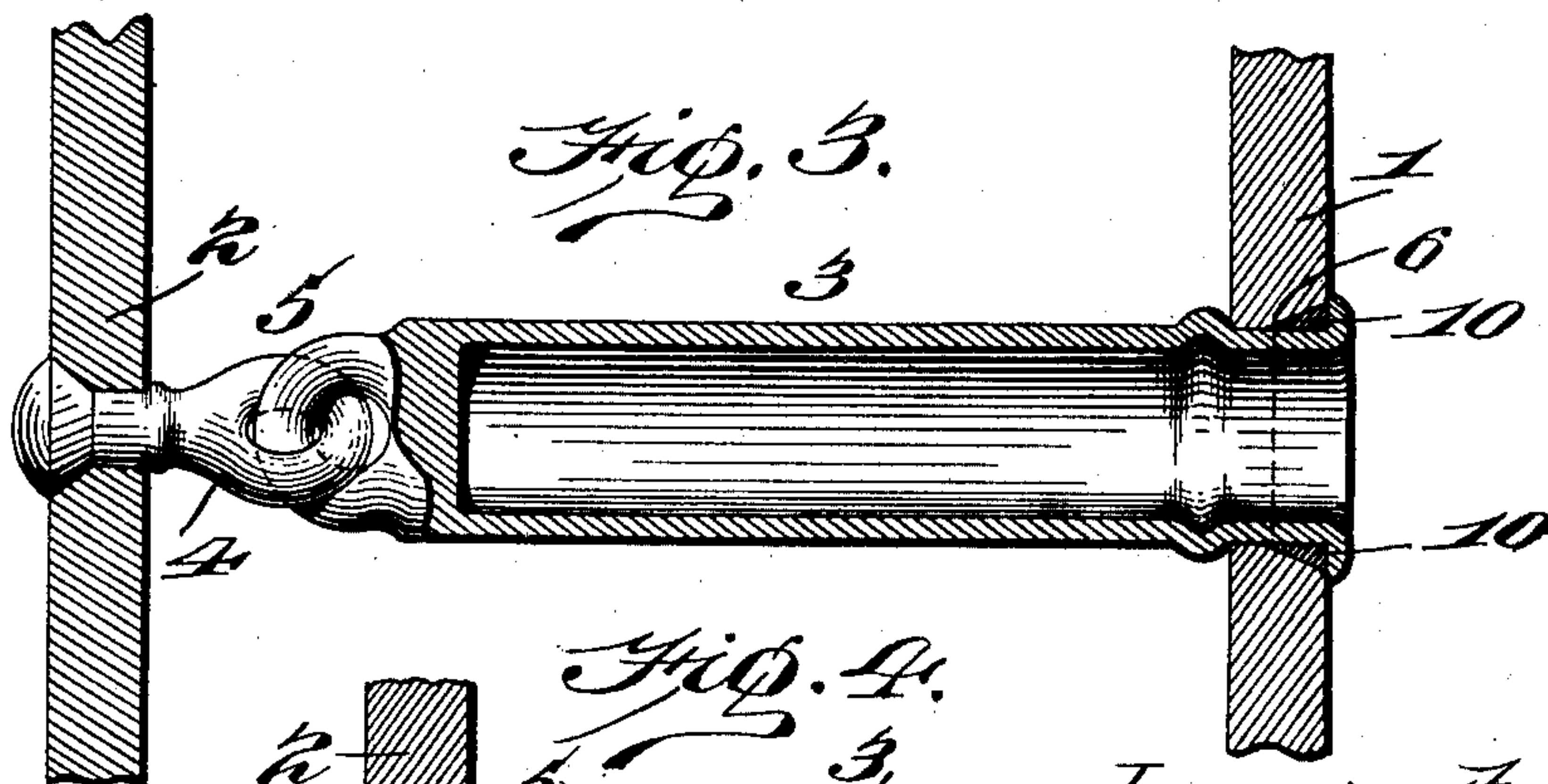
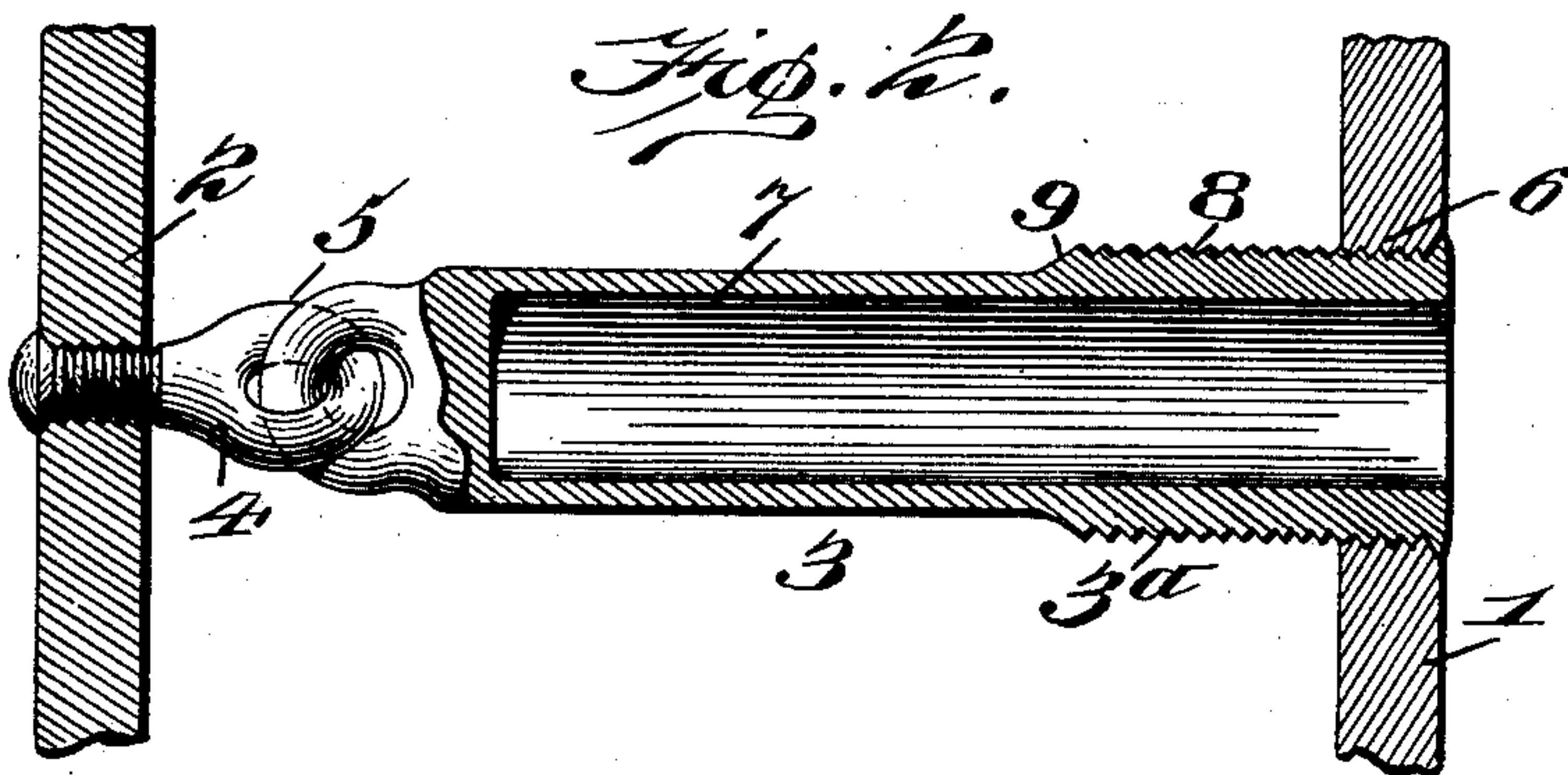
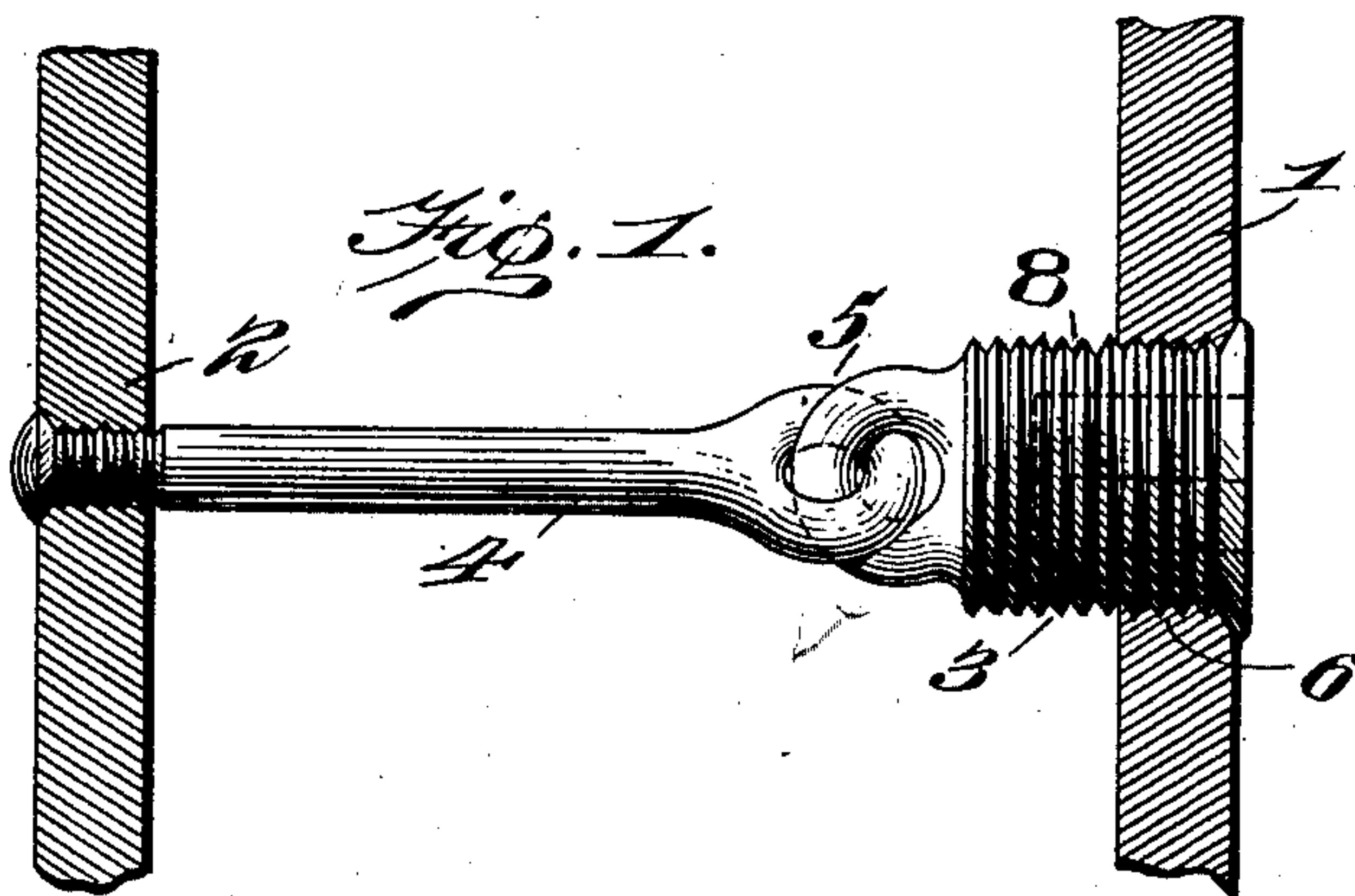
PATENTED APR. 19, 1904.

D. L. SHAFFER.

STAY BOLT.

APPLICATION FILED JULY 18, 1903.

NO MODEL.



Witnesses:

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UNITED STATES PATENT OFFICE.

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STAY-BOLT.

SPECIFICATION forming part of Letters Patent No. 757,973, dated April 19, 1904.

Application filed July 18, 1903. Serial No. 166,085. (No model.)

To all whom it may concern:

Be it known that I, DAVID L. SHAFFER, a resident of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Stay-Bolts; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to stay-bolts for steam-boilers; and its object is to provide a stay-bolt which will not break under the contraction and expansion of the boiler.

One of the difficulties in the use of steam-boilers is the constant contraction and expansion to which the same are subjected in use, and as a consequence the stay-bolts are subjected to a constant warping or bending strain in opposite directions. This results in breaking the bolts close to one of the sheets to which the bolts are attached.

The object of my invention is to provide a stay-bolt for steam-boilers wherein the above objection is overcome. To this end the bolt is made flexible—that is, of two sections suitably jointed together, so that they can move relatively to each other, each section being provided at its ends with means for securing it to the sheet.

The invention also comprises certain details of construction hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a side view of one form of my improved stay-bolt. Fig. 2 is a modification thereof to provide increased heating capacity to the boiler, and Fig. 3 is still another modification showing a different form of joint. Fig. 4 is another modification in which the large end is threaded the entire length.

In the drawings the sheets which are connected by the stay-bolts are shown at 1 and 2. The stay-bolt is made of two sections 3 and 4, which are suitably jointed to each other, so that they can move at least a limited amount in all directions. Various forms of joints may be employed, that shown in the drawings being a simple and efficient one and comprises an eye 5, formed on the ends of each joint, which eyes interlock, as shown, so as to form, in effect, a knuckle-joint. This joint, however, prevents independent rotary movement

of the two sections, so that the bolt can be screwed into place by turning on one end thereof. This knuckle-joint is necessarily of considerable size, and as a consequence the hole in one of the sheets must be made sufficiently large to permit the entrance of the bolt. This is clearly shown in the drawings, where in the hole 6 in the sheet 1 is made quite large and the section 3 of the bolt is made of a size sufficient to fill this hole. When it is desired to increase the heating capacity of the furnace, the large section 3 of the bolt can be made very long, as shown in Fig. 2, and hollow, as shown at 7, thus forming, in effect, a tubular stay-bolt open at its inner end to the furnace, so that the flame and heat can enter said tube, and thus increase the heating-surface of the fire-box. Each section is provided with suitable means at its ends for securing the bolt to the sheets. As shown in Figs. 1 and 2, both sections are provided with threaded ends 8 for screwing into the holes in the sheets. The outer end of the large tubular section 3^a (shown in Fig. 2) is slightly enlarged where the screw-threads are formed, as shown at 9, to obviate the necessity of threading the said section through its entire length. Various other forms of attaching means to the flue-sheets may be employed—as, for instance, in Fig. 3 the hole 6 in the sheet 1 is slightly reamed out on its outer face, and a small conical metallic thimble 10 is placed in said depression surrounding the bolt-section 3^a, after which the end of the latter is expanded outwardly over said thimble, this thimble acting as a non-compressible packing-ring for the joint. Fig. 4 is a modification in which the large section is threaded for its entire length.

The knuckle-joint (shown at 5) permits the two bolt-sections to move relatively to each other in all directions, so that unequal expansion and contraction of the boiler parts will not produce any bending strains in the metal of the bolt. As a consequence they will last much longer than an ordinary non-flexible bolt.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. A stay-bolt composed of two sections jointed together in such manner as to prevent

independent rotary movement of said sections and each provided with means at its ends for attachment to the boiler-sheets.

2. A stay-bolt composed of two sections connected to each other by a knuckle-joint so arranged as to prevent independent rotary movement of said sections and each provided with means at its ends for attachment to the boiler-sheets.

3. A stay-bolt composed of two sections provided with interlocking eyes at their meeting ends and each provided with means at its outer end for connection to the boiler-sheet.

4. A stay-bolt composed of two sections connected to each other by a knuckle-joint so arranged as to prevent independent rotary movement of said sections, one of said sections be-

ing of a diameter equal to the greatest diameter of said joint, and each section being provided with means at its ends for connection to the boiler-sheets.

5. A stay-bolt composed of two sections connected to each other by a flexible joint so arranged as to prevent independent rotary movement of said sections, one of said sections being of larger diameter than the other and hollow from its outer end into proximity to said joint.

In testimony whereof I, the said DAVID L. SHAFFER, have hereunto set my hand.

DAVID L. SHAFFER.

Witnesses:

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G. C. RAYMOND.