

W. M. SMITH.

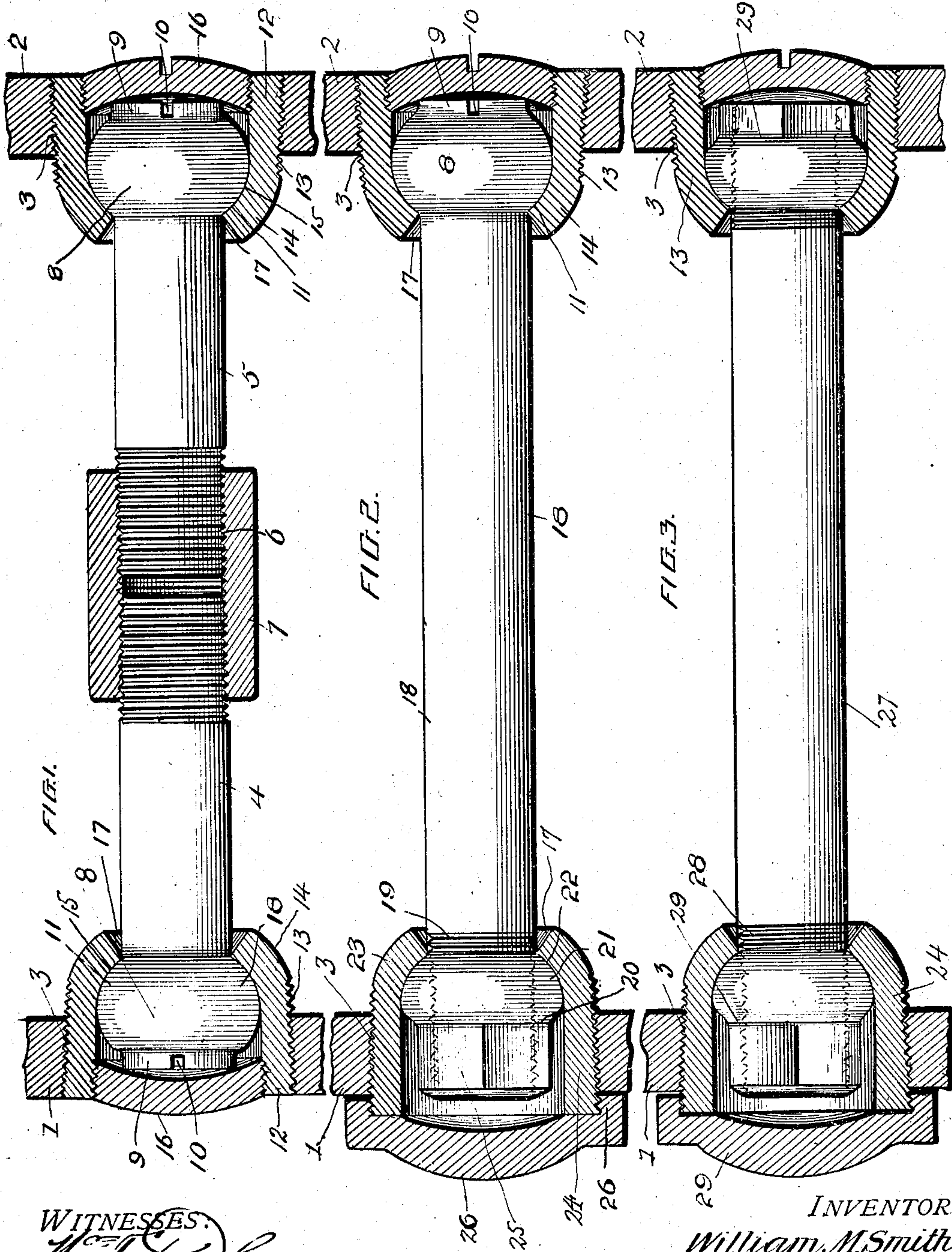
STAY BOLT.

APPLICATION FILED FEB. 20, 1909.

930,807.

Patented Aug. 10, 1909.

2 SHEETS—SHEET 1.



WITNESSES.
W. F. Kaye
M. E. Lowry

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INVENTOR
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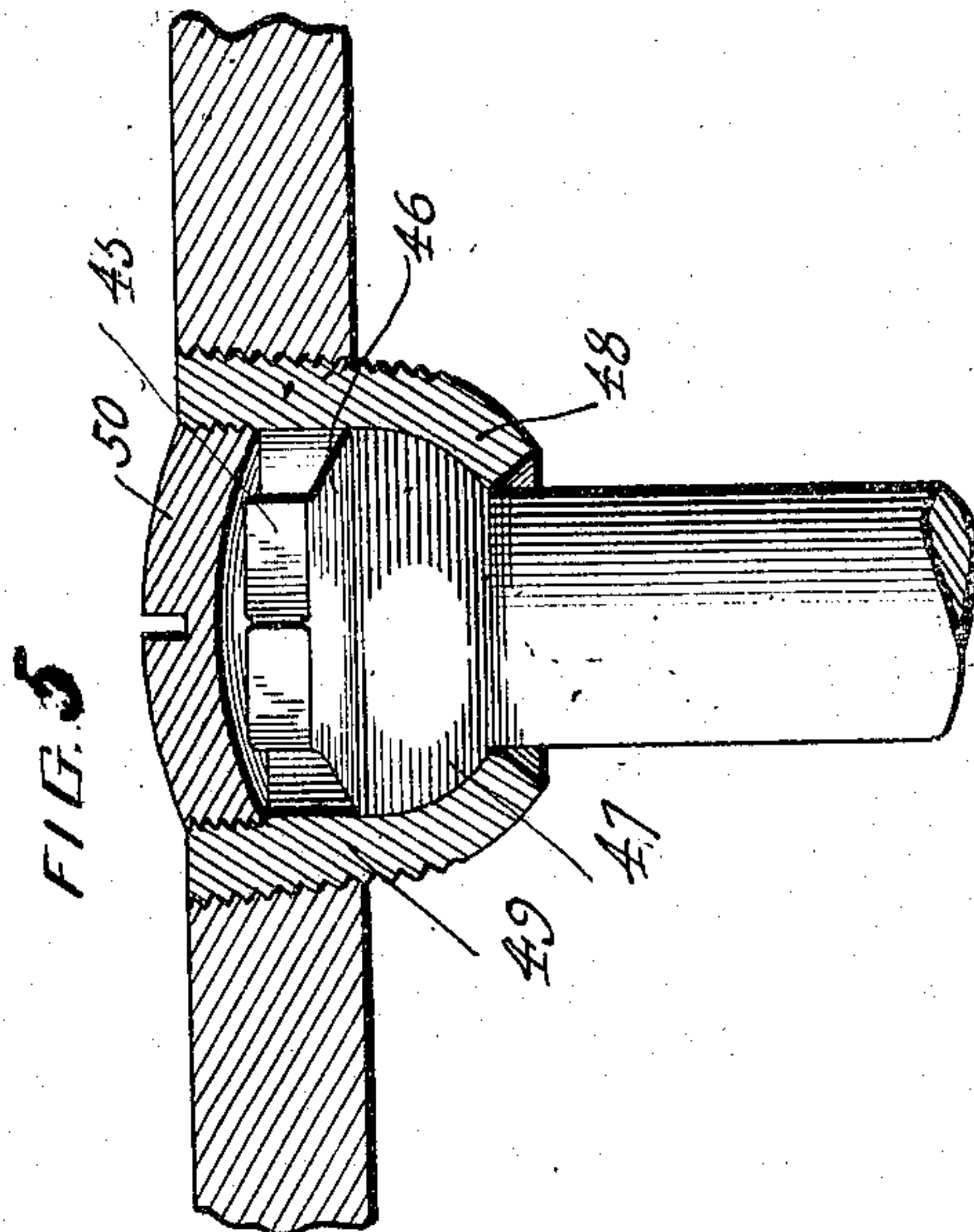
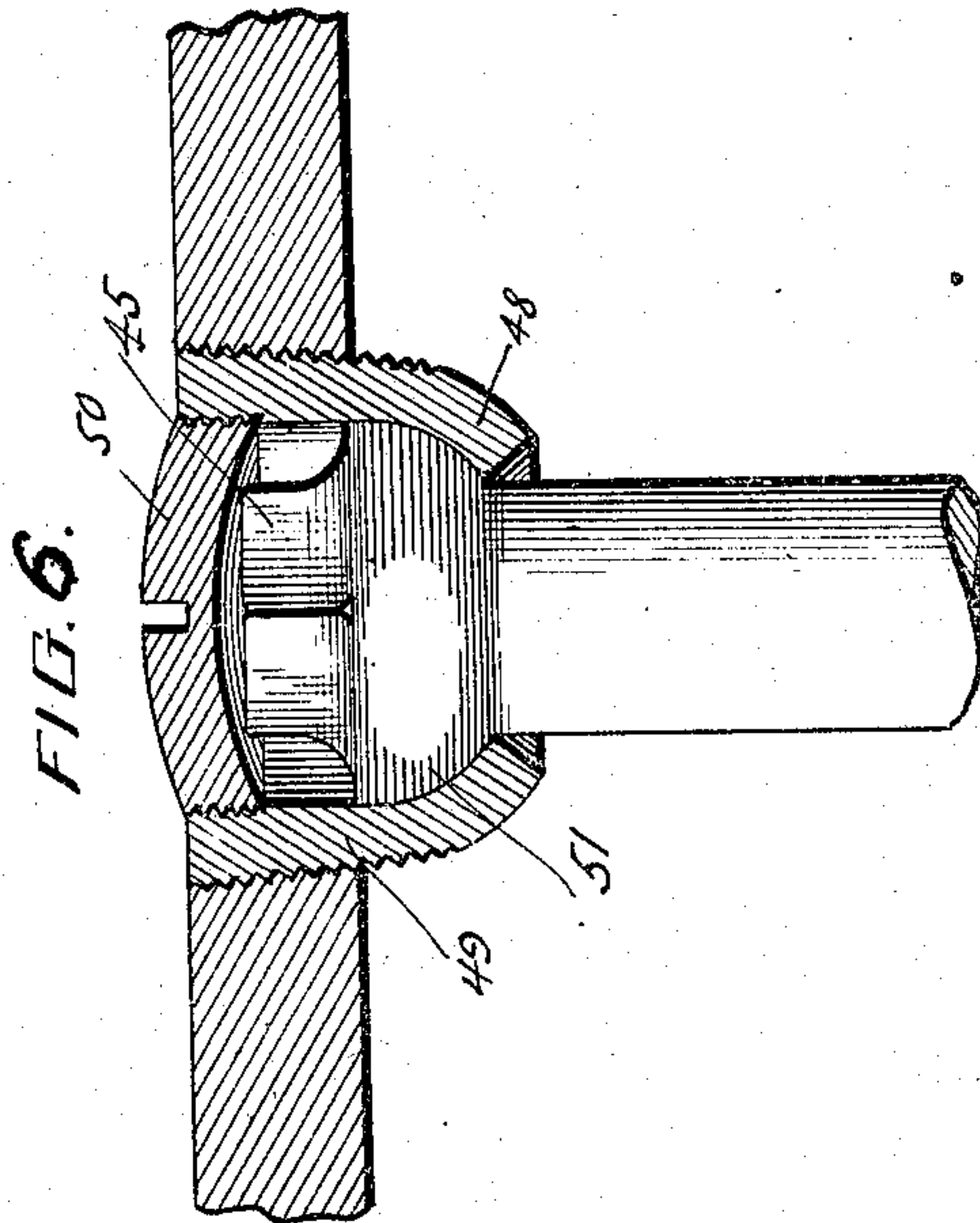
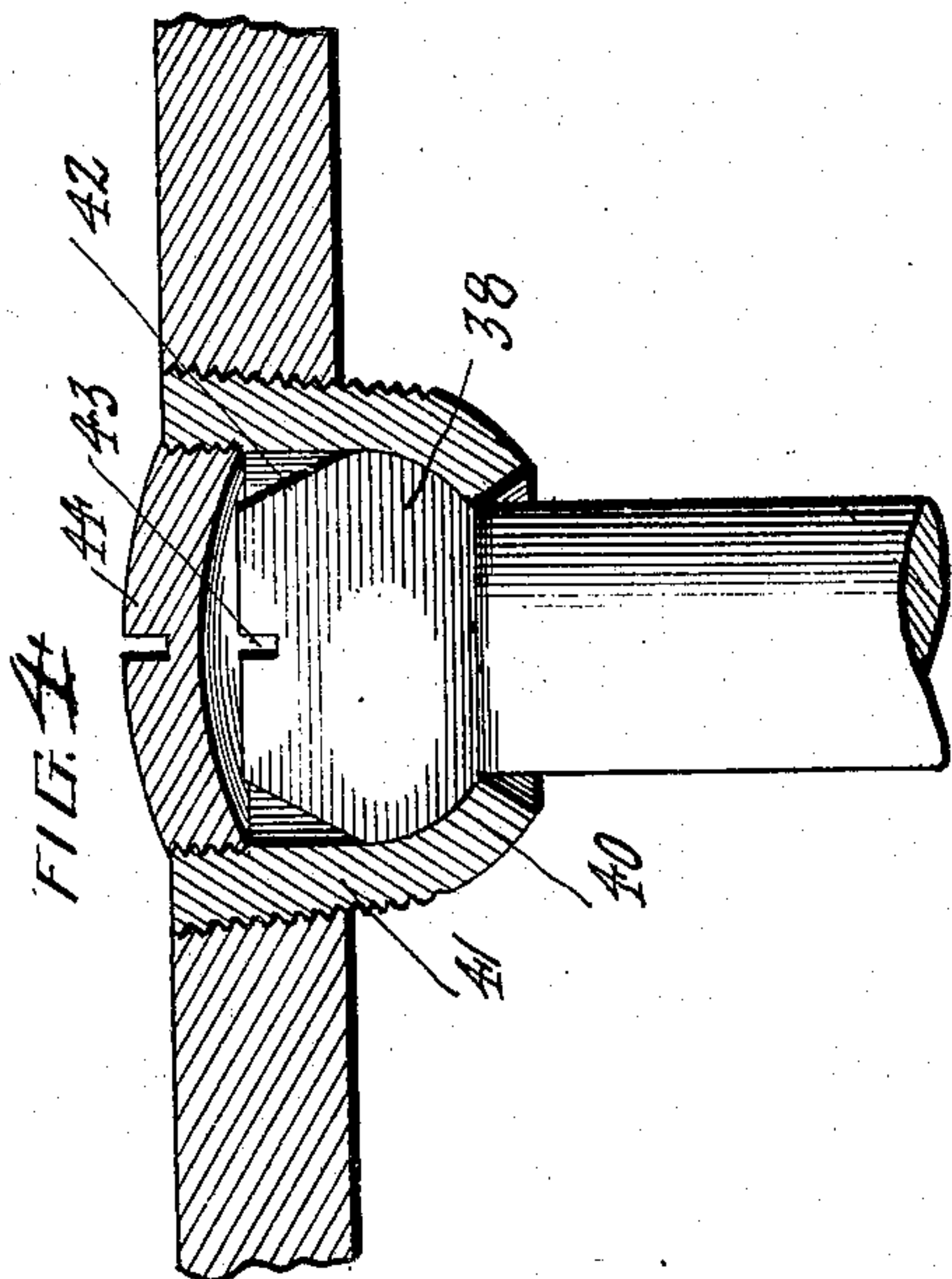
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UNITED STATES PATENT OFFICE.

WILLIAM M. SMITH, OF TURTLE CREEK, PENNSYLVANIA.

STAY-BOLT.

No. 930,807.

Specification of Letters Patent.

Patented Aug. 10, 1909.

Application filed February 20, 1909. Serial No. 479,164.

To all whom it may concern:

Be it known that I, WILLIAM M. SMITH, a citizen of the United States, residing at Turtle Creek, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Stay-Bolts, of which the following is a specification.

This invention relates to that class of stay bolts which are used for the purpose of staying sheets of locomotive and other steam boilers and the object thereof is to provide a stay bolt with means at each end thereof whereby a steam tight connection is had between the boiler sheet and the ends of the bolt and furthermore whereby the necessary degree of flexibility for the bolt is obtained to overcome breakage of the bolt due to expansion of the boiler sheets when building up the fire or to high pressure steam.

Further objects of the invention are to provide a flexible stay bolt which shall be simple in its construction, strong, durable, efficient in its use, readily set up and inexpensive to manufacture.

With the foregoing and other objects in view the invention consists of the novel construction, combination and arrangement of parts hereinafter more specifically described and illustrated in the accompanying drawings wherein is shown the preferred embodiment of the invention, but it is to be understood that changes, variations and modifications can be resorted to which come within the scope of the claims hereunto appended.

In the drawings, wherein like reference characters denote corresponding parts throughout the several views, Figure 1 is a side elevation, partly in section, of a flexible stay bolt in accordance with this invention showing the adaptation thereof in connection with the inner and outer sheets of a boiler. Figs. 2 and 3 are similar views of modified forms, and, Figs. 4, 5, and 6 illustrate further modified forms.

Referring to Figs. 1, 2 and 3, 1 indicates the outer sheet of a boiler and 2 the inner sheet, the said sheets 1 and 2 are provided with openings 3, the openings in the sheet 1 being arranged opposite the openings in the sheet 2.

Referring to Fig. 1 of the drawings, 4 and 5 denote the sections of the shank of the bolt, each of said sections is formed at its inner end with threads 6 with which

engages a threaded coupling sleeve 7 whereby the said sections 4 and 5 are adjustably coupled together. Each of the sections 4 and 5 at its outer end is formed with a rounded head 8 having an annular protuberance 9 grooved as at 10 for the reception of a suitable tool for adjusting a section to increase or decrease the length of the bolt when occasion so requires. The inner portion 11 of the periphery of the head 8 constitutes a bearing surface and is capable of shifting upon its bearing, the latter to be hereinafter referred to, during the expansion of the boiler sheets whereby breakage of the bolt will be prevented. The bearings for the heads of the sections 4 and 5 consist of hollow tapering plugs 12 which are formed with peripheral threads 13 for engagement with the threaded walls of the openings 3. The hollow plugs 12 extend through the boiler sheets 1 and 2 and are of a length as to project inwardly of the inner face of the said sheets. The inner ends of the plugs 12 are inturned as at 14 to provide the seats 15 for the bearing surfaces 11 and upon said seats 15 the heads 8 can flex so as to prevent breakage of the bolt when the boiler sheets shift or expand due to the building up of the fire or high pressure of steam. The inner face of each of the plugs 12 is screw-threaded as at 15 with which engages the threaded cap 16 to provide a seal for the plug 12 whereby a steam tight connection is formed. The wall of the opening at the inner end of each of the plugs 12 is flared or beveled as at 17 to permit of the shifting of the shank of the bolt when the heads 8 shift upon the seats.

Referring to the construction shown in Fig. 2, the shank of the bolt is formed of one piece and is indicated by the reference character 18. One end of the shank 18 is screw-threaded as at 19 for the reception of a removable head 20 having a rounded inner portion as at 21 which constitutes a bearing surface 22 engaging the seat formed by the inturned inner end 23 of the hollow plug 24. The removable head 20 has its outer portion squared as at 25 for the reception of a suitable tool for the purpose of positioning the head 20 upon the threaded end of the shank 18. If desired, the head 20 can be positioned by hand as the outer squared end 25 of the head enables it to be readily gripped by the fingers. The plug 24 is peripherally threaded and extends through the threaded opening 3 in the sheet 1. The plug 24 not

only projects from the inner face of the sheet 1 but also from the outer face and the outer end thereof is closed by a removable cap 26 which engages with the peripheral threads of the plug 24. The other end of the shank 18 and the manner of mounting the said shank is the same as that referred to in connection with either end of the sections 4, 5, shown in Fig. 1, the same reference characters being applied thereto.

Referring to Fig. 3 of the drawings, the shank is indicated by the reference character 27 and each end thereof is threaded as at 28 and is provided with a removable head 29 of a construction similar to the head 24 shown in Fig. 2. The manner of mounting the head 29 in the boiler sheet 1 is the same as that set forth in connection with the mounting of the head 20 in Fig. 2 and the manner of mounting the head 29 in the sheet 2 is the same as that referred to in connection with the mounting of the head 8 in the sheet 1. It is thought unnecessary to specifically describe the mountings under such circumstances.

Referring to Fig. 4 a modified form of head for the bolt is shown and which is indicated by the reference character 38 and in this connection it will be stated that the inner portion of the head 38 is rounded to constitute a bearing surface which engages the seat 40 formed by the inturned inner portion of the hollow plug 41. The outer portion of the head 38 is truncated as at 42 and provided with a groove 43 for the reception of a suitable tool to adjust the bolt. The plug 41 is closed by a cap 44.

Referring to Fig. 5, the outer portion of the head of the bolt is squared as at 45 for the reception of a suitable tool, the said squared portion terminates in a truncated portion 46. The inner portion of the head of the bolt is rounded as at 47, the periphery constituting a bearing surface which engages the seat 48 formed by the inturned end of the plug 49, the latter is closed by a cap 50.

In the modification shown in Fig. 6, the inner portion of the head of the bolt is rounded as at 51 and the outer portion squared, in the form shown in Fig. 6 the truncated portion 46 is dispensed with. Otherwise than that stated, the construction shown in Fig. 6 and the mounting of the head is the same as that shown in Fig. 5.

By providing each end of the bolt with a head whether removable or fixed and associating with each of the heads a seat upon which the head can shift, provision is made to overcome breakage of the bolt due to the expansion of the inner as well as the outer boiler sheet. Furthermore owing to the manner in which the bolt is connected to either one of the boiler sheets, it can be readily removed or inserted at any time with-

out destroying or removing the hollow plug. By providing the tapering plugs, it is evident that they can be readily positioned in the screw-threaded openings of the boiler sheets and that if through some cause the bolt should become damaged, it can be readily removed without necessitating the removal of the plugs, these latter can be utilized in connection with a new bolt as is obvious.

What I claim is:

1. In combination, a pair of oppositely disposed tapering hollow plugs having peripheral threads for connection to the opposite sheets of a boiler, said plugs open from end to end, said plugs projecting inwardly from the inner faces of the boiler sheets, each of said plugs having the body portion thereof at its inner end inturned in a curvilinear manner to form an annular seat curvilinear in longitudinal section and whereby the inner edge of the body portion will be flared with respect to the axis of the plug, said flared inner edge projecting from the inner terminus of said curvilinear seat, said seats arranged in a plane inwardly of the inner faces of the boiler sheets, removable means for closing the outer ends of said plugs, and a bolt having a head at each end, each of said heads having a portion thereof rounded to constitute a bearing surface, said surfaces engaging the seats of the plug and adapted to shift thereon on the expansion of the boiler sheets, said flared inner edge of said plugs providing a clearance for the shank during the shifting of the heads upon said seats.

2. In combination, a pair of oppositely disposed tapering hollow plugs having peripheral threads for connection to the opposite sheets of a boiler, said plugs open from end to end, said plugs projecting inwardly from the inner faces of the boiler sheets, each of said plugs having the body portion thereof at its inner end inturned in a curvilinear manner to form an annular seat curvilinear in longitudinal section and whereby the inner edge of the body portion will be flared with respect to the axis of the plug, said flared inner edge projecting from the inner terminus of said curvilinear seat, said seats arranged in a plane inwardly of the inner faces of the boiler sheets, removable means for closing the outer ends of said plugs, and an adjustable bolt having a head at each end, each of said heads having a portion thereof rounded to constitute a bearing surface, said surfaces engaging the seats of the plug and adapted to shift thereon on the expansion of the boiler sheets, said flared inner edge of said plugs providing a clearance for the shank during the shifting of the heads upon said seats, each of said heads provided with means to facilitate the adjustment of the bolt by a suitable tool.

3. In combination, a pair of oppositely disposed tapering hollow plugs having peripheral threads for connection to the opposite sheets of a boiler, said plugs open from end to end, said plugs projecting inwardly from the inner faces of the boiler sheets, each of said plugs having the body portion thereof at its inner end inturned in a curvilinear manner to form an annular seat curvilinear in longitudinal section and whereby the inner edge of the body portion will be flared with respect to the axis of the plug, said flared inner edge projecting from the inner terminus of said curvilinear seat, said seats arranged in a plane inwardly of the inner faces of the boiler sheets, removable means for closing the outer ends of said plugs, and a bolt having a head at each end, each of said heads having a portion thereof rounded to constitute a bearing surface, said surfaces engaging the seats of the plugs and adapted to shift thereon on the expansion of the boiler sheets, said bolt having its shank formed in two sections, the inner terminus of each section being screw-threaded, and a collar engaging the threads of the section for adjustably connecting the sections together, said flared inner edges of said plugs constituting a clearance for the movement of the shank of the bolt when the heads shift upon said seats, and said heads provided with means to facilitate the adjustment of the sections of the shanks by a suitable tool.

4. In combination, a pair of oppositely disposed hollow tapering plugs having peripheral threads for connection to the opposite sheets of a boiler, said plugs open from end to end, each of said plugs having its body portion of the same thickness from its inner to its outer edge and further having a flat outer edge, said plugs projecting inwardly from the inner faces of the boiler sheets, each of said plugs having the body portion thereof at its inner end inturned in a curvilinear manner to form an annular seat curvilinear in longitudinal section and whereby the inner edge of the body portion will be flared, said flared inner edge projecting from the inner terminus of the seat, said seats arranged in a plane inwardly of the inner faces of the boiler sheets, removable means for closing the outer ends of said plugs, and a bolt having a head at each end, each of said heads having a portion thereof rounded to constitute a bearing surface, said surfaces engaging the seats of the plugs and adapted to shift thereon on the expansion of the boiler sheets.

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

WILLIAM M. SMITH.

Witnesses:

A. M. WILSON,
N. LOUIS BOGAN.