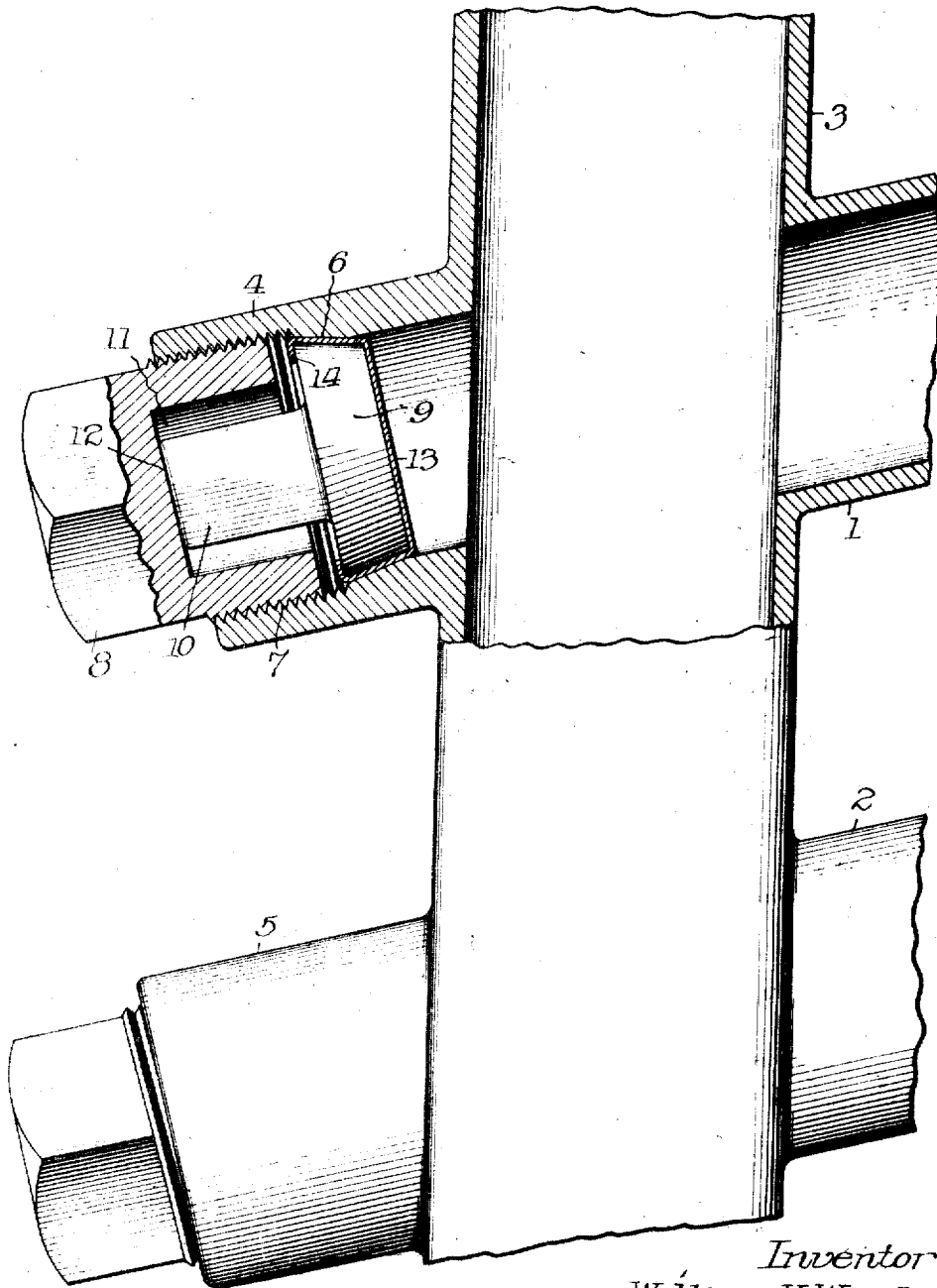


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REMOVABLE PLUG FOR BOILERS AND THE LIKE.
APPLICATION FILED JULY 26, 1915.

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UNITED STATES PATENT OFFICE.

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REMOVABLE PLUG FOR BOILERS AND THE LIKE.

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To all whom it may concern:

Be it known that I, WILLIAM H. WINSLOW, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Removable Plugs for Boilers and the like, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

The present invention relates to removable plugs for boilers, or the like.

It is well known in the art that washout plugs are provided in most boilers to allow of removal of mud and scale when the boiler is cleaned. In low pressure boilers the ordinary brass plug that is threaded into the shell of the boiler is fairly satisfactory. Such plugs are not practical for high pressure boilers, especially of the type shown in my co-pending applications, Serial No. 656,179, filed October 23rd, 1911, Serial No. 841,445, filed May 28th, 1914, Serial No. 859,157, filed August 29th, 1914, which are designed to carry regularly 500 or 600 lbs. per square inch steam pressure. Not only is the pressure too great but the temperature is so high that the difference in thermal coefficient of expansion destroys the value of the plug as a closure. Screw plugs are further impractical because they must be drawn up so tightly for high pressures that removal and insertion of a plug large enough to allow access to the interior of the boiler requires too much power. In other words it becomes a task that is beyond the repairman or cleaner.

The object of my invention is to provide an improved plug which is easily put in place or removed and which will remain tight even under high pressure. I shall now describe more fully in the following specification, in connection with the accompanying drawings, one embodiment of my invention.

The single figure of the drawings is a fragmentary section of part of a boiler showing the plug in position on its seat.

In boilers of the type set out in my above-mentioned co-pending applications, it is desirable to clean the tubes, especially the lowermost tubes in each section where mud and

scale are most likely to deposit and settle. The tubes 1 and 2 which may form the lowermost tubes in the section or may be any other tubes that it is desired to clean, are welded to the header 3 by autogenous welding so as to form these parts into a unitary integral structure. The tubes and headers are made preferably of steel tubing. Hollow bosses 4 and 5 are formed on the header 3 in alignment with the tubes 1 and 2 and on the opposite side thereof so that the opening in these bosses 4 and 5 are in alignment with the openings in the tubes 1 and 2. These hollow bosses may be formed of thimbles welded to the header 3, or where the particular portion of the header 3 is formed of a steel casting, these hollow bosses 4 and 5 may be made of cast metal integral with the rest of the casting. The hollow boss has a conical seat 6 of rather a small degree of taper. The boss is counter-bored and screw-threaded at 7 to receive a plug 8. A conical plug 9 having a squared shank 10 is seated upon the annular seat 6 in the boss 4. The squared shank 10 extends into a recess 11 in the threaded plug 8 and has its outer end which is squared off, resting against the bottom 12 of the cavity 11 for holding the plug 9 upon its seat 6. The conical plug 9 is faced with a jacket 13 of a tough and fairly soft metal, preferably copper. This jacket of copper 13 extends over the front face of the plug 9 and over the conical portion in the form of a cup or pan and is folded over at the back of the plug as shown at 14. This jacket forms an imperforate conical gasket which forms a very tight closure between the tapered plug 9 and the seat 6. In fact this copper jacket forms the real closure, the plug 9 being merely a vehicle for it and a means for holding it in place after it is applied.

The action of the device is entirely different from a screw plug or from a conical valve, as heretofore constructed in the art. It is to be distinctly noted that the conical plug 9 does not revolve and has a longitudinal movement only. The plug 9 with the copper facing is inserted into the opening and placed loosely on the seat 6. The screw-plug 8 is then screwed into the threaded part 7 and the squared shank 10 of the plug 9 rests against the bottom 12

of the cavity 11, this bottom 12 being faced off accurately so as to hold the conical plug 9 in exact alinement in the axis of the boss 4. As the screw-plug 8 is drawn up, the plug 9 is forced along the axis of the tube driving the same forward against the conical seat 6, gripping the copper gasket 13 firmly against the seat so as to form a very tight joint. The area of contact between the bottom 12 of the plug 8 and the end of the shank 10 is much smaller than the area of contact between the plug 9 and the copper gasket 13, or between the copper gasket 13 and the seat 6, and as a consequence the plug 9 does not turn when the screw-plug 8 is drawn tight.

Due to the fact that the gasket or jacket 13 is imperforate, it is necessary to make only one steam tight joint and that is between this gasket and the seat 6. This is a great advantage, as is readily apparent.

When the plug 9 is to be removed, the screw-plug 8 is unscrewed. This may readily be accomplished as the threaded portion 7 consists preferably of straight threads and as soon as the pressure upon the stem 10 is relieved, the plug 8 may readily be withdrawn by hand. A piece of pipe having a squared end or a tube having a squared socket is slipped over the shank 10 of the plug 9 and the plug is wobbled on its seat by sidewise motion of the stem whereupon the same may readily be withdrawn without any trouble. The shank 10 need not be square and may be made round or in any preferred form.

Due to the short distance which the copper gasket or jacket 13 moves on the seat 6, the copper does not have an opportunity to ball and spoil the joint, as would be the case if the plug 9 were rotated when brought upon its seat. The plug 9 may be made of cast iron or of steel and in either case the coefficient of expansion due to changes in temperature would be substantially the same as that of the soft steel which forms the seat 6. The copper jacket 13 is of such small dimensions that the difference in expansion would be inappreciable and as a consequence the joint always remains tight. The end of the shank 10 is squared so as to bear against the surface 12, these two surfaces being at right angles to the axis of the boss 4. As a consequence it is impossible to insert the plug 9 in a skewed manner for as soon as pressure is brought upon the stem 10 by means of the plug 8 the plug 9 will be squared up with the axis of the boss and will be properly seated upon the seat 6.

The space between the hollow plug 8 and the back edge of the conical plug 9 is very slight, being only about one-sixteenth of an inch so that the conical plug cannot get started crooked on its seat. If it should start crooked the rim of the hollow plug

would touch the back edge of the plug 9 and would straighten it upon its seat. This distance has been exaggerated in the drawings in order to make clear that there is normally no contact between the back edge of the conical plug and the front parts of the screw plug.

While I have shown one specific embodiment of my invention, I do not intend to be limited to the precise details of construction shown and described, as changes, variations and modifications will immediately suggest themselves to those skilled in the art and I consider the same to come within the spirit and scope of my invention.

What I claim as new and desire to secure by Letters Patent of the United States is the following:

1. In combination a hollow boss having an internally threaded portion and a conical seat adjacent said threaded portion, an internal conical plug in said seat, guiding means on the rear of said conical plug for guiding the same upon said conical seat, a screw-plug engaging said conical plug and clamping the same against said seat, the lateral walls of the boss being imperforate.

2. In combination a hollow threaded boss having a conical seat adjacent the threads, a conical plug, guiding means on the rear of said conical plug for guiding the same upon said conical seat, a soft metal gasket between the plug and the seat, a screw-plug engaging the threads and holding said conical plug and the gasket upon the seat, said gasket being formed of an imperforate cup entirely inclosing the front and conical sides of said conical plug.

3. In combination a hollow internally threaded boss having an internal conical seat adjacent the threaded portion, a hollow conical cup shaped gasket of soft metal engaging said seat, a solid metallic conical plug in said gasket and holding the same against said seat, a threaded plug for engaging the threads in said boss and for clamping said conical plug and said gasket against said seat, and guiding means on the rear of said conical plug for guiding said plug and said gasket upon said seat.

4. In combination a hollow boss having an annular conical seat therein, a cooperating plug for engaging said seat, said boss having an internally threaded portion, a threaded plug cooperating with said threaded portion, said plug having a stem of reduced diameter, said stem having its end face only in engagement with said threaded plug and a soft metal gasket between said seat and the plug cooperating therewith.

5. In combination a hollow boss having a conical seat, a threaded counterbore, a conical plug having a stem, an imperforate metal gasket covering the front and the conical sides of said plug, a threaded plug having

a recess therein, said recess adapted to receive loosely the stem of said conical plug, the bottom of the recess normally pressing against the end of the stem.

5 6. In combination a hollow boss having a solid metallic conical seat therein and a threaded portion adjacent said seat, an imperforate conical gasket engaging said seat, a conical plug having its front and conical
10 sides covered by said gasket, said plug having a stem extending at right angles to the body thereof, said stem having a square end, a hollow threaded plug for engaging the threads in said boss, the hollow portion of
15 said plug having a flat bottom wall for engaging the square end of said stem, said plug completely filling said gasket and forming the sole engagement between the hollow plug and the conical plug.

20 7. In combination a header, a tube joined thereto and having communication therewith, a hollow boss on the opposite side of said header in axial alinement with said tube, said hollow boss having a seat therein
25 and a threaded portion adjacent thereto, a conical plug bearing on said seat, said plug having a stem projecting in axial alinement with said boss, a screw plug for engaging the threaded portion of the boss, said plug
30 having a recess therein, the bottom wall of said recess engaging the end of said stem and forcing the conical plug upon its seat, said engagement forming the sole engagement between said plugs.

35 8. In combination a closed vessel, a hollow boss on said vessel having communication with the interior thereof, said boss having a screw-threaded portion and a conical seat portion, a conical plug having a facing
40 of soft tough metal forming in coöperation with said seat a closure for said hollow boss, said plug having a stem extending axially therefrom, said stem having a bearing surface upon the end thereof, a screw-plug for
45 engaging the threaded portion of said boss, said plug having a coöperating engaging surface for alining said closure plug with said seat, the engaging surfaces being of less area than the area of engagement between
50 the seat and the plug and forming the sole contact between the conical plug and the screw plug.

9. In combination a conical plug comprising an enlarged conical portion and a stem
55 extending axially therefrom and a gasket formed in the shape of a pan, said gasket embracing said enlarged conical portion and having its rim folded against the side thereof adjacent the point where said stem joins
60 said enlarged portion.

10. In combination a conical seat, a plug comprising an enlarged conical portion and a reduced stem portion attached thereto, an imperforate gasket inclosing said enlarged
65 conical portion and engaging said seat and

means for holding said plug and gasket against said seat, said means engaging the end of said stem only.

11. In combination a conical annular seat, a solid metallic plug having an enlarged
70 conical portion, an imperforate gasket engaging said conical seat and forming a closure therefor, means for holding said plug and said gasket against said seat, said plug
75 having means coöperating with said holding means to aline the same upon said seat and having a stem of reduced diameter adapted to engage said holding means at its end only.

12. In combination, a conical seat, a conical plug for engaging said seat, said plug
80 having a short stem of reduced diameter projecting from the rear thereof, said stem being faced off flat at right angles to the axis of the plug, a screw threaded holding member having a flat face for engaging the
85 flat end of the stem, the area of engagement between the stem and the holding member being substantially less than the engaging area between the conical plug and seat to insure relative rotation between the stem and
90 the holding member and to prevent rotation of the plug on its seat when the holding member is screwed into or out of engagement with the stem.

13. In combination, a hollow boss, a conical
95 seat in said boss, a threaded counterbore between said seat and the end of said boss, a solid metallic plug member having a conical head adapted to bear upon said conical seat, an imperforate metal gasket embracing
100 said conical head, a screw plug threading into the counterbore and adapted to hold said plug member tight against said conical seat, a short stem of reduced diameter projecting from the rear of said conical head,
105 said stem being finished off flat at right angles to the axis of the plug member, said stem fitting loosely into an enlarged recess in the end of said screw plug, the area of engagement between the stem and the bottom of the
110 recess being substantially less than the engaging area between the conical plug and its seat to insure relative rotation between the stem and the screw plug and to prevent rotation of the plug member on the conical
115 seat when the screw plug is started into and out of engagement with the plug member.

14. In combination, a steam header, a circulating tube intersecting one side of said
120 steam header, a hollow boss on the other side of said header and co-extensive with said circulating tube, said boss having its ends internally threaded, a conical seat in said hollow boss at the end of said thread,
125 a solid metallic plug member having a conical head adapted to bear upon said conical seat, a soft metal gasket formed in the shape of a pan embracing said conical head and having its rim crimped over the back thereof, a screw plug engaging in the
130

threaded portion of said boss, a short stem
of reduced diameter projecting from the
rear of said plug member, said stem fitting
loosely into an enlarged recess in the end of
5 said screw plug, and slightly separating the
front end of said screw plug and back of
said conical head, whereby said screw plug
is normally out of engagement with said
conical head but serves to correctly aline
10 the latter upon its seat, said stem and the
bottom of said recess being faced off at right

angles to the axis of said screw plug, the
area of engagement between the stem and
the screw plug being substantially less than
the engaging area between the conical head 15
and seat to insure relative rotation between
the stem and the screw plug and to prevent
rotation of the conical head on said seat.

In witness whereof, I hereunto subscribe
my name this 23rd day of July, A. D. 1915. 20

WILLIAM H. WINSLOW.