

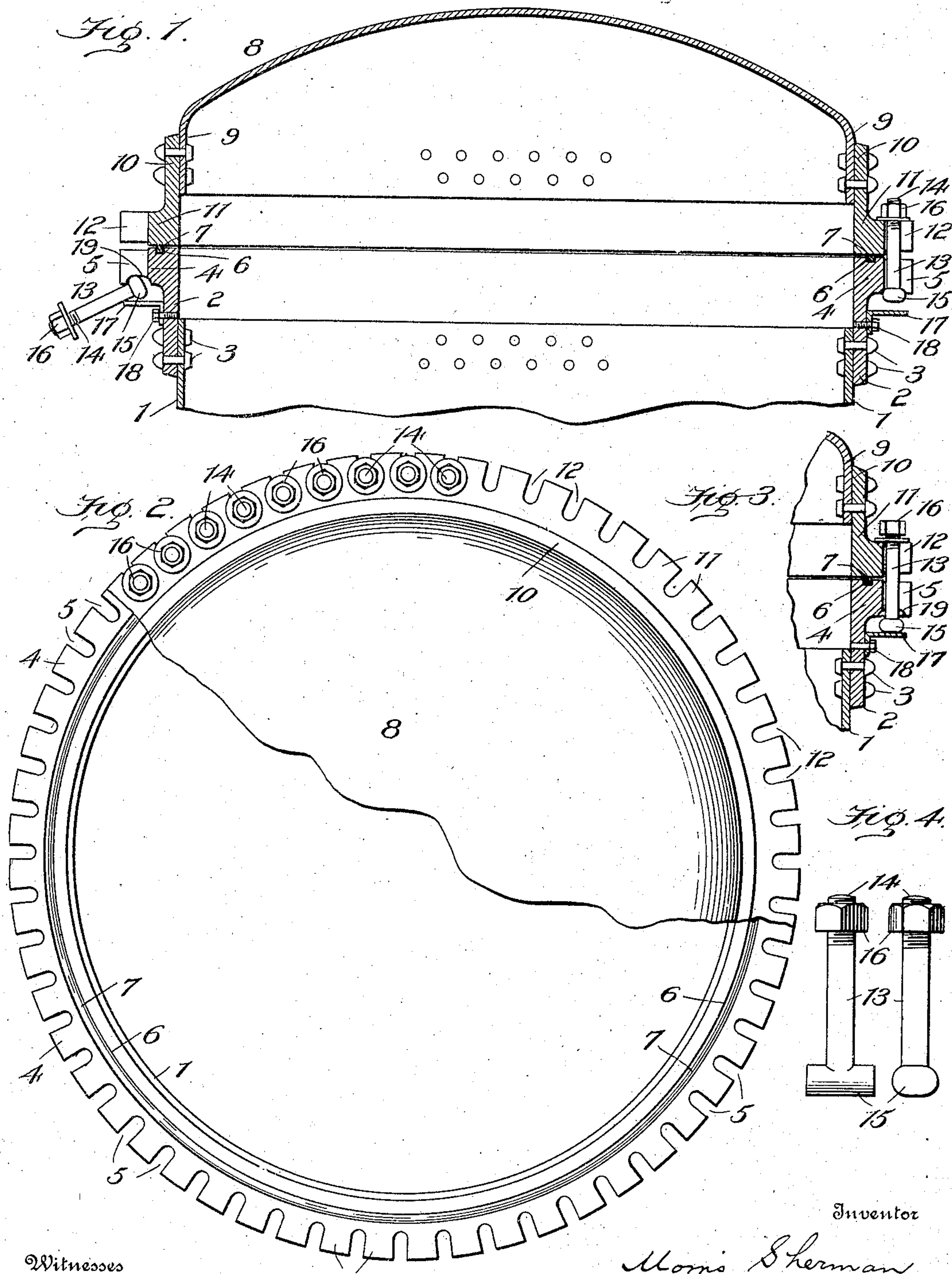
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M. SHERMAN.

MEANS FOR SECURING HEADS TO BOILERS, CYLINDERS, &c.

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# UNITED STATES PATENT OFFICE.

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## MEANS FOR SECURING HEADS TO BOILERS, CYLINDERS, &c.

SPECIFICATION forming part of Letters Patent No. 781,371, dated January 31, 1905.

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*To all whom it may concern:*

Be it known that I, MORRIS SHERMAN, a citizen of the United States, residing at Chattanooga, in the county of Hamilton and State of Tennessee, have invented new and useful Improvements in Means for Securing Heads to Boilers, Cylinders, and the Like, of which the following is a specification.

My invention has relation to new and useful improvements in means for securing heads or covers to boilers, cylinders, tanks, and the like, and particularly to structures of the character mentioned wherein the shell of the boiler or tank and the head or cover thereof are provided, respectively, with cooperating flanges which are secured together by means of clamping devices to maintain the head or cover in position on the shell; and the primary object of the invention is to simplify the art as now existing and provide novel and improved means for maintaining the clamping devices in position on the shell whereby they may be moved out of operative relation to the head when it is desired to remove the latter without disconnecting said devices from the shell.

A further object of the invention is to provide clamping devices of improved form, means for maintaining them in position on the shell, and means associated therewith operating to permit one or more of said devices to be removed from the shell without displacing the remaining devices.

Briefly and generally stated, the invention consists in providing, in combination with a boiler, cylinder, or tank shell and its head or cover, clamping devices removably engaging portions of the shell or head and having a novel connection with either of said elements which will permit said clamping devices to be moved out of clamping position and also permit them to be removed when in one position after having been released from clamping action.

I have fully and clearly illustrated my invention in the accompanying drawings, to be taken as a part of this specification, and wherein—

Figure 1 is a longitudinal central section through one end of a boiler or tank shell, showing the head or cover in position thereon, the

clamping devices on one side of the shell being shown in position to clamp the head and shell together and at the other side thrown out of engagement with the head to permit removal of the latter. Fig. 2 is a top plan view. Fig. 3 is a detailed section through the meeting edges of the shell and head, the clamping device or bolt being in the position it assumes after being released from clamping engagement with the flanges on the head and shell in order that it may be removed from the slots in said flanges. Fig. 4 is a view showing the improved bolt in a side and front elevation.

Referring to the drawings, 1 designates the cylindrical shell of a boiler, cylinder, tank, or other receptacle in connection with which the invention is employed. At its upper end this shell is provided with an exterior vertically-extending collar 2, secured to the shell by suitable bolts 3, and projecting laterally from this collar and integral therewith is an exterior annular flange 4, which has formed in the edge thereof a plurality of spaced slots 5, which open outwardly through the periphery of said flange. This collar is also provided on its upper edge with an annular groove 6, in which is seated a suitable packing 7, which preferably consists of a strand of soft copper wire.

8 designates the cover or head of the boiler, said cover being of any desired form and having a downwardly-extending annular rim 9, to which is secured a depending collar 10, having an exterior annular lateral flange 11, which when the cover is in position to close the shell rests upon the flange 4 thereon and is formed with spaced slots 12, which register with the slots 5 in said flange 4 and which are similar in form thereto.

Arranged in each pair of registering slots and engaging the flanges to clamp the same together, and thereby maintain the head in position, is a clamping device, shown in the form of a bolt, which is of a novel form to now be described. This improved clamp-bolt consists of the usual shank 13, having screw-threads 14 at one end and at its opposite end provided with a cross-bar 15, said cross-bar being substantially elliptical in cross-section, the short axis of the ellipse being substantially



at a right angle to the shank. The bolts as just described when in proper position to clamp the flanges 4 and 11 together are arranged with the cross-bar 15 beneath the flange 4, and the shank extends upwardly through the recesses 5 and 12, the threaded end of the bolts projecting above the flange 12 and carrying clamping-nuts 16, by means of which the flanges are clamped together to maintain the head in position on the shell.

Upon the collar 2 on the shell 1 is secured a horizontally-extending exterior flange 17, which is detachably secured to the collar by means of fastening-screws 18, which engage suitable threaded openings in said collar. This flange is arranged in a plane substantially parallel to the flange 4 and at a distance below the under face thereof slightly greater than the short axis of the cross-bar 15, but less than the longer axis thereof, the arrangement being such that when the nuts are removed from the bolts said bolts may drop down vertically and then by a lateral movement away from the shell and head be removed from engagement therewith through the open ends of the slots 5 and 12, this being permissible owing to the fact that the vertical or short axis of the cross-bar is less than the distance between the flange 5 and the flange 17 and may readily pass between the same. This feature thus described will be found quite advantageous when it becomes necessary to replace any one of the bolts, in view of the fact that they are independent of each other as far as their removal is concerned and may be removed without affecting the others or requiring the flange 17 to be detached from the shell. However, when it is desired to remove the cover or head without detaching the bolts from the shell the nuts may be removed from the bolts or loosened thereon, and said bolts may then be swung outwardly, as shown in Fig. 3 in full lines, on the cross-bar as a pivot until the shank of the bolt is removed through the open ends of the slots in the flanges 4 and 11, at which time the cover or head may be removed. It will be seen that in being swung outwardly the bolts will not become detached from the shell, for the reason that a slight rotary movement of the cross-bar 15 brings the transverse or long axis of said cross-bar across the space between the flanges 4 and 11, and said axis being longer than the width of the space it is impossible under ordinary conditions to displace the cross-bar from its position. To assist in maintaining the cross-bar in position, provide for a free rotary movement thereof, and prevent the flange from being sprung downward when the bolt is swung out of position, as would be the case were the under side of the flange 4 flat, I form in the under face of said flange 4 in the portions between the slots grooves or recesses 19, in which the portion of the cross-bar adjacent the shank of the bolt is seated when in position to clamp

the flanges 4 and 11 together and which effectually prevents any lateral movement of the bolts while in such clamping position and also holds them against rotation when screwing the nuts into position. It will also be seen that these recesses or grooves permit easy rotation of the cross-bar, inasmuch as the sides of the cross-bar turn into said recesses when the bolt is swung out of position, so that the increased width of said cross-bar when the bolt is in the position shown to the left of Fig. 1 with relation to the space between the flanges 4 and 16 prevents binding or jamming of the cross-bar on said flanges and obviates the liability to displace the flange 17.

From the above description it will be seen that the construction of the clamping-bolts and the manner of associating the flange 17 therewith provides a simple and effective means for detachably securing said bolts to the shell and at the same time maintain them in position on the shell when the head is to be removed.

The manner of operating the invention to accomplish the various objects which it is constructed to attain is as follows: When it is desired to clamp the head or cover in position to close the shell 1, said head is positioned with the flange 11 resting on the flange 4 with the open slots in said flanges in registration. The clamping devices or bolts 13 are then held in vertical position with their heads directed toward the stop-flange 17 and the threaded shank extending toward the flange on the opposite element from the one carrying said stop-flange. The bolt is then moved laterally into the slots 5 and 12 through the open ends thereof, the head 15 passing between the flange 4 and the stop-flange, the threaded shank projecting above the flange 11, and said bolt will then be in position for the application of the clamping-nut 16, which when screwed down pulls the cross-bar up into the groove 19 and engages the flange 11 to clamp the head and shell together in a manner which is obvious. In order to remove the head without entirely disconnecting the bolt from the shell, the clamping-nut is removed from the bolt or loosened from engagement with the flange 11, and said bolt may then be swung outwardly on the arc of a circle out of the slots in the flanges, the bolt swinging on its head as a pivot, and it will be seen that inasmuch as the transverse axis of said head is greater than the distance between the stop-flange and the flange 4 the bolt may be swung without the head becoming dislodged from between said latter-named flanges. If for any reason it should be desired that a bolt be entirely removed from the head and shell, the clamping-nut is removed and the bolt permitted to drop down in a straight line, so that the head becomes disengaged from the groove 19 and rests upon the stop-flange, when said bolt may be removed laterally and removed



bodily from engagement with the flanges and the shell, the head passing through the space between the flange 4 and stop-flange 17, owing to the fact that the short transverse axis of said head is less than the distance between said flanges.

While I have shown and described the invention as embodying bolts having heads consisting of cross-bars, which provides the most efficient means for accomplishing the objects in view, nevertheless I do not desire to be limited to a head of such form, as a headed bolt of the ordinary form might be used advantageously.

I do not wish to be limited to the flange 17 as being the sole means of serving as a stop in connection with the heads of the clamping-bolts, but desire my invention to include any and all forms of devices which might be substituted for the flange and which cooperate with the bolts in the manner set forth.

What I claim is—

1. The combination of the shell and closure therefor, each provided with an annular flange having open slots therein, said flanges abutting each other with their respective slots in registration, clamping-bolts removably arranged in the slots, each bolt consisting of a shank having at one end a head engaging one of said flanges, and a clamping means at the opposite end engaging the other flange, and a stop arranged at a distance from the said head less than the transverse diameter thereof.

2. The combination of the shell and closure therefor, each provided with an annular flange having open slots therein, said flanges abutting each other with their respective slots in registration, clamping-bolts removably arranged in the slots, each bolt consisting of a shank having at one end a head engaging one of said flanges, and a clamping means at the opposite end engaging the other flange, said head being substantially elliptical in cross-section, the long axis of the ellipse being at

right angles to the longitudinal axis of the shank, and a stop arranged at a distance from the head less than said long axis thereof.

3. The combination of the shell and closure therefor, each provided with an annular flange having open slots therein, said flanges abutting each other with their slots in registration, headed clamping-bolts arranged in said slots, means to normally prevent removal of the bolts, and a rigid annular flange disposed adjacent the heads of the bolts whereby the bolts may be removed when in one position only with relation to said first-named means.

4. The combination of the shell and closure therefor, each provided with an annular flange having open slots therein, said flanges abutting each other with their slots in registration, clamping-bolts arranged in said slots, means associated with the heads of the bolts to normally prevent removal thereof and means whereby the bolts may be removed when the heads are in one position only with relation to the first-named means.

5. The combination of the shell and closure therefor, each provided with an annular flange having open slots therein, said flanges abutting each other with their slots in registration, clamping-bolts arranged in said slots, means associated with the heads of the bolts to prevent removal of said bolts, said means being normally out of engagement with the heads.

6. The combination of the shell and closure therefor, each provided with an annular flange having open slots therein, said flanges abutting each other with their slots in registration, a headed bolt passing through a pair of registering slots, and a rigid stop device arranged adjacent to and in line with the bolt.

MORRIS SHERMAN.

In presence of—

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