Sept. 7, 1937. W. T. RAY 2,092,182

PLUGGING DEVICE

Filed May 20, 1935

Fig 1

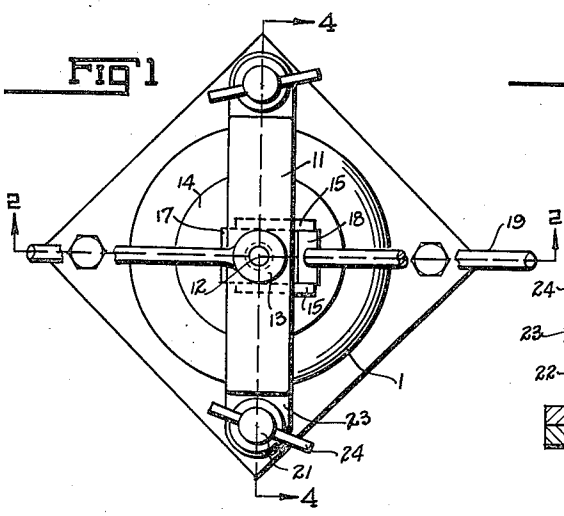


Fig 4

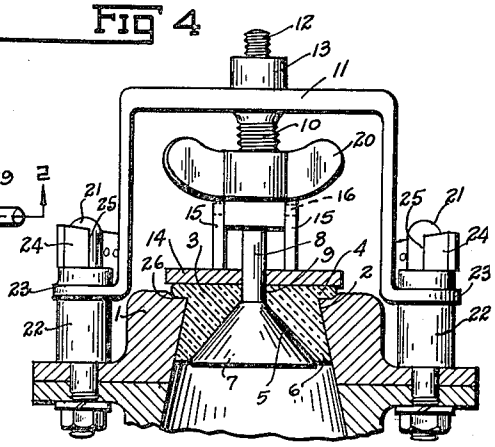


Fig 2

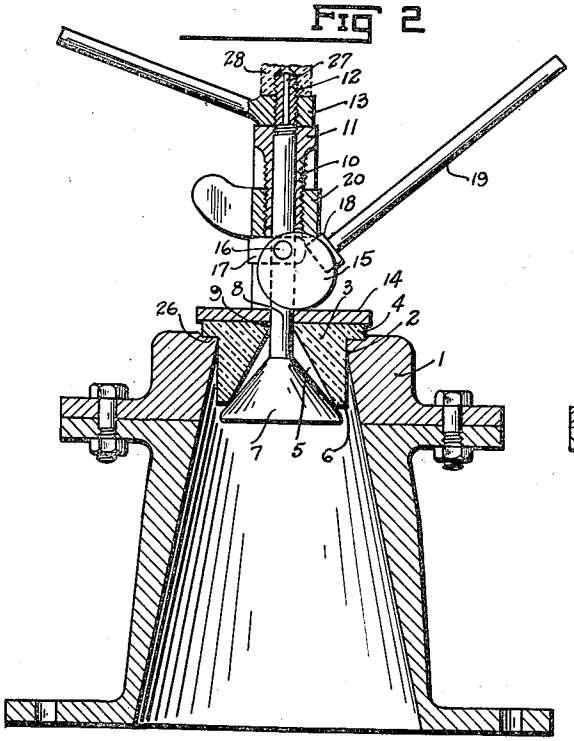
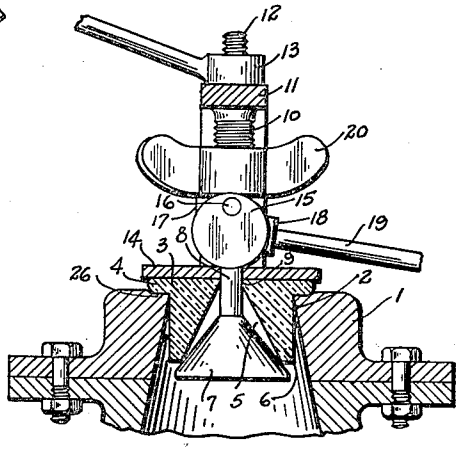


Fig 3



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PLUGGING DEVICE

William T. Ray, Wichita, Kans.

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9 Claims. (Cl. 220—24.5)

This invention relates to a plugging device for use in pressure testing and particularly to a double sealing plugging device, positive in operation and adapted for use in pressure testing the exhaust nozzle, joints, steam pipes and superheater in a locomotive.

The primary object of my invention is to provide a sealing plug which will not leak under any reasonable testing pressures or conditions. A further object is to provide a plug which can be quickly applied or removed when it is necessary to pressure test the exhaust nozzle, etc., in a locomotive. A still further object of my invention is to provide a positive locking means for maintaining the plug in sealing position and thereby eliminate the danger of injury to operators from sudden leaks in the plug.

In so far as I am aware, pressure testing plugs and devices now in use require considerable time to be installed and in many instances have failed to provide an efficient plug thereby resulting in sudden escape of hot water or steam and causing deaths and serious injuries to workmen in close proximity to the devices. With my invention, however, installation time is cut down to a minimum and there is no danger of leakage.

The objects and advantages of my invention will be better understood by reference to the following description in connection with the accompanying drawing in which:

Fig. 1 is a top plan view of my invention applied to the exhaust nozzle of a locomotive.

Fig. 2 is a vertical sectional view on the line 2—2 of Fig. 1, showing the plugging device applied, preliminary to the sealing operation.

Fig. 3 is a fragmentary, vertical, sectional view similar to Fig. 2, partly in elevation, showing the position of the parts after the first sealing operation is completed.

Fig. 4 is a fragmentary, vertical view, partly in elevation and partly in section on the line 4—4 of Fig. 1, showing the position of the parts after the second sealing operation is performed, the plugging device now being in full sealing position.

Referring now to the drawing by numerals of reference, 1 designates an exhaust nozzle of a locomotive through which, in normal operation, live steam is forced to provide an efficient furnace draft. Nozzle 1 has a circular opening 2 which it is desired to close or plug during pressure testing operations.

My invention, therefore, consists of a circular, resilient sealing member or plug 3, having an annular flange 4 and a downwardly extending, conical opening 5 forming annular wall or rib 6. Wall expanding member or conical plunger 7 is concentrically positioned in opening 5 and is affixed to stem or plunger rod 8 which passes through opening 9 in plug 3 and is guided by vertical guide member 10 depending from frame or supporting member 11. The upper end 12 of plunger rod 8 extends through the guide 10 and support 11, and adjusting nut 13 is in threaded engagement therewith.

Loosely resting on top of and concentric with the flange 4 is flat rigid plate or washer 14 with central opening to accommodate stem 8. The diameter of plate 14 is preferably the same as or slightly larger than the diameter of flange 4.

Means for providing a downward pressure on the plate 14 and consequently on the flange 4 is shown as comprising a pair of spaced cams 15, eccentrically pivoted at 16 to pivot carrying member 17 slidably mounted on stem 8. Crossbar 18 rigidly connecting the cams 15 carries lever 19 for operating said cams.

The top surface of the pivot carrying member 17 bears against an adjusting wing nut 20 threaded to vertical guide member 10. The eccentric cams 15 are so mounted that when handle or lever 19 is depressed the cams will go past dead center and remain fixed in that position.

In attaching the plugging device to the exhaust nozzle 1, suitable upstanding bolts 21 are provided on the exhaust nozzle. Spacing members or collars 22 and flanges 23 of support 11 are slipped over the bolts and retained in position by keys 24 in slots 25.

When it is desired to test the joints, exhaust nozzle, steam pipes and superheater in a locomotive the plugging device is affixed to the exhaust nozzle in the manner described in the above paragraph, the lever 19 being in raised position and the plunger 7 being at its lowest position at which no pressure is exerted against the annular wall 6, thus allowing the resilient plug 3 to easily enter the opening 2 of the exhaust nozzle.

When the keys 24 are securely inserted in slots 25, the adjusting wing nut 20 is turned until lever 19 is in raised position with the periphery of cams 15 contacting top surface of plate 14 Lever 19 is then drawn downward, the cams 15 exerting a downward pressure on plate 14 and plug 3 causing the flanges 4 of the plug to bear tightly against surface 26 of exhaust nozzle 1 and thereby providing a circumferential seal, the first step of the sealing operation being completed. The lever 19 will remain in lowered position since the center line of the cams has passed the vertical center line of the pivots.

In the second step of the sealing operation, adjusting nut 13 is turned, raising the wall expanding member or conical plunger 7 to exert a pressure against the annular wall or rib 6 until it is in intimate contact with annular wall of opening 2 of exhaust nozzle thus completing the sealing operation.

It can readily be seen that any pressure against the enlarged end of conical plunger 7 will tend

to increase the seal between the annular wall 6 and the interior wall of the exhaust nozzle, and if the operator neglects to perform the first sealing operation or in the event of failure of sealing flange 4, the second sealing operation will be sufficient to maintain a leakproof joint between the plug and the exhaust nozzle. It is also obvious that the annular flange 4 and its operating mechanism are sufficient to form a tight seal which will be leakproof under normal testing pressures.

Stem 8 may be provided with passage 27 connected with the opening 2 in the exhaust nozzle 1, and the base of a pressure gauge 28 may be applied to the end 12 of the stem for determining the pounds pressure being applied for the test.

From the foregoing it will be seen that I have provided a simple, efficient, positive acting sealing plug which may be quickly and easily installed and when properly applied will maintain its sealing qualities and not endanger workmen by blowing out or springing a sudden leak.

It is obvious that the principles involved in my invention may be applied on plugs used in pressure testing or sealing other devices and therefore I do not wish to be limited to the particular application shown and described herein. It is also to be understood that slight changes in form, proportion and details of construction may be resorted to without departing from the spirit of my invention.

What I claim as new and desire to secure by Letters Patent is:

1. A plugging device for sealing the end of an exhaust nozzle or conduit comprising a resilient plug having an annular flange and an annular wall, means for compressing the annular flange against the end of the nozzle or conduit and means for expanding the annular wall against the inner surface of the nozzle or conduit.

2. A plugging device for sealing the end of an exhaust nozzle or conduit comprising a resilient plug having an annular flange at one end thereof, a concavity in the other end forming an annular wall, means for compressing the annular flange against the end of the nozzle or conduit and means for expanding the annular wall against the inner surface of the nozzle or conduit.

3. A plugging device for sealing the end of an exhaust nozzle or conduit comprising a resilient plug having an annular flange at one end thereof and a concavity in the other end forming an annular wall, a rigid plate bearing against the annular flange and a wall expanding member or plunger received in the concavity, means for exerting pressure against said plate to compress the flange against the end of the nozzle or conduit and means for moving the plunger into the concavity to expand the annular wall against the side of the nozzle or conduit.

4. A plugging device for sealing the end of an exhaust nozzle or conduit comprising a resilient plug having an annular flange at one end thereof and a concavity in the other end forming an annular wall, means for compressing the annular flange against the end of the nozzle or conduit, means for expanding the annular wall against the inner surface of the nozzle or conduit and means removably mounted to the nozzle or conduit for supporting the flange compressing means and the wall expanding means.

5. A plugging device for sealing the end of an exhaust nozzle or conduit comprising a resilient plug having an annular flange at one end thereof and a concavity in the other end forming an annular wall, a frame or support removably mounted to the nozzle or conduit, flange compressing means comprising a flat rigid plate resting on the flanged end of the plug, a cam member bearing on the plate, a lever extending from the cam member, a pivot carrying member to which said cam member is eccentrically pivoted, a vertical guide carried by the frame, a cam adjusting member in threaded engagement with said guide and against which the pivot carrying member bears, wall expanding means comprising a wall expanding member or plunger positioned in said concavity, a stem or plunger rod affixed to the plunger and extending through the plug, plate, pivot carrying member, vertical guide and frame, an adjusting nut in threaded engagement with the upper end of said plunger rod for regulating the vertical movement of the plunger and consequently the amount of pressure against the annular wall of the resilient plug.

6. A plugging device for sealing the end of an exhaust nozzle or conduit comprising a resilient plug having an annular flange at one end thereof and a concavity in the other end forming an annular wall, a wall expanding member or plunger in the concavity, a stem or plunger rod affixed to the plunger, and flange compressing means and plunger actuating means centered on said stem or plunger rod.

7. A plugging device for sealing the end of an exhaust nozzle or conduit comprising a resilient plug having an annular flange at one end thereof and a concavity in the other end forming an annular wall, a frame or support removably mountable to the exhaust nozzle or conduit, a wall expanding member or plunger in the concavity, a stem or plunger rod affixed to the plunger and extending through the plug and frame or support, and flange compressing means and plunger actuating means centered on said stem or plunger between the resilient plug and the frame or support.

8. A plugging device for sealing the end of an exhaust nozzle or conduit comprising a sealing means compressible against the end of the exhaust nozzle or conduit and a second sealing means expandible against the inner wall of the exhaust nozzle or conduit, said first and second named sealing means being operable independently of each other, each sealing means forming a complete seal.

9. A plugging device for sealing the end of an exhaust nozzle or conduit, comprising a resilient plug having an annular flange at one end thereof and a concavity in the other end forming an annular wall, a wall expanding member or plunger in the concavity, a stem or plunger rod affixed to the plunger, and flange compressing means and plunger actuating means centered on said stem or plunger rod, the upper end of said plunger rod being adapted to receive a pressure gauge, and a passage through said stem or plunger rod connecting the interior of the exhaust nozzle or conduit with the pressure gauge.

WILLIAM T. RAY.