June 5, 1962 J. E. ROBB 3,037,796

THREADED ADAPTOR FOR LUGGED PIPE ENDS

Filed Oct. 2, 1959

Fig. 1

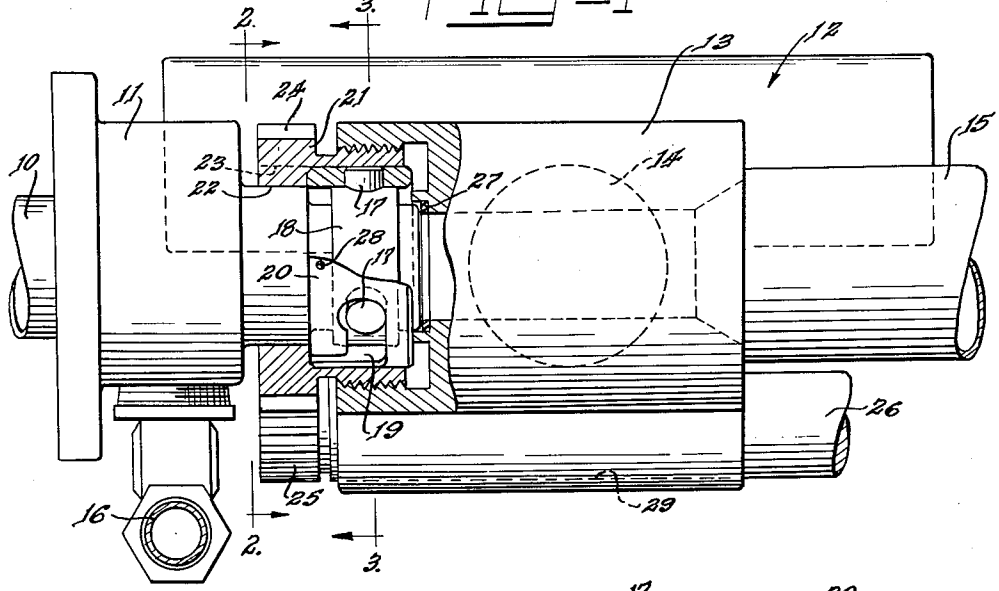


Fig. 2

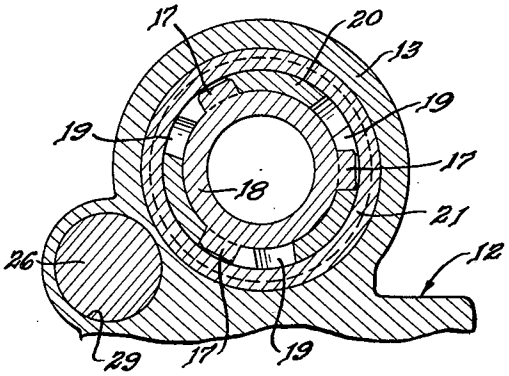
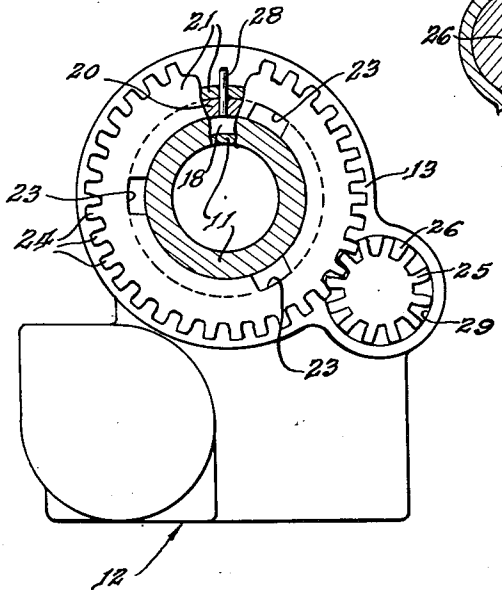


Fig. 3



INVENTOR.
John E. Robb

BY
Roland A. Anderson
Attorney

United States Patent Office 3,037,796
Patented June 5, 1962

3,037,796

THREADED ADAPTOR FOR LUGGED PIPE ENDS

John E. Robb, Bethesda, Md., assignor to the United States of America as represented by the United States Atomic Energy Commission

Filed Oct. 2, 1959, Ser. No. 844,150
2 Claims. (Cl. 285—3)

This invention relates to an arrangement for attaching fluid-conducting parts to one another. More particularly, it relates to adaptor parts enabling a tubular member with lugs to be connected to a valve.

It has been customary to close a reactor coolant tube by means of a cap with bayonet slots applied to lugs on a tubular member attached to the discharge end of the coolant tube, as shown in Morris Patent 2,863,817 dated December 9, 1958. A plurality of such coolant tubes along with graphite moderator through which the tubes extend and fuel elements positioned in the tubes with spaces between the slugs and tubes for coolant to flow through may constitute a reactor of the type shown in FIGS. 37, 38, and 39 of Fermi et al. Patent 2,708,656, dated May 17, 1956.

Under certain circumstances of reactor operation, it becomes highly desirable to replace the caps on the tubes with valves, so that coolant may be kept flowing through the coolant tubes while fuel elements are being removed therefrom.

The present invention enables the lugs otherwise used to attach the caps for closing the coolant tubes to remain and to be employed for attaching valves to the coolant tubes in place of the caps. It would be difficult and costly to remove the lugs or the tubular members directly carrying the lugs and connected to the discharge ends of the coolant tubes.

In the drawings:

FIG. 1 is a plan view, partly in section, showing how a valve is attached to the discharge end of a reactor coolant tube, in accordance with the present invention;

FIG. 2 is a sectional view taken on the line 2—2 of FIG. 1; and

FIG. 3 is a sectional view taken on the line 3—3 of FIG. 1.

The discharge end of a reactor coolant tube **10** is attached to one end of a tubular member **11**. The other end of the tubular member **11** is attached so as to be sealed against leakage, to a valve **12**, comprising a body **13** and a gate **14**, mounted therein for rotation about an axis perpendicular to the plane of the drawing for opening and closing.

Attached to the valve **12** is a fuel-element guide **15** in the form of a tubular section that curves into the plane of the drawing, so as to guide downwardly fuel elements being discharged from the coolant tube **10** through the tubular member **11** and the valve **12**. A conduit **16** is connected at one end of the tubular member **11** and at the other end to a discharge header (not shown), so that, even when the valve **12** is closed, coolant water flows from the tube **10** through the tubular member **11** and conduit **16** to the discharge header.

The tubular member **11** carries three lugs **17** spaced 120° from one another about the tubular member. The lugs **17** are attached either directly to the tubular member **11** or directly to a collar **18** quasi-permanently attached to the tubular member **11**, because presumably the tubular member **11** was designed for use, or was actually used, with a closing cap such as disclosed in the aforementioned Morris patent, rather than with the valve **12**.

The lugs **17** are received in three equally spaced bayonet- or J-slots **19** formed in a retainer ring **20**, which lies

within a short sleeve **21**. This sleeve has an internal shoulder **22** which abuts the inner end of the retainer ring **20** and has three equally spaced longitudinal slots **23**. The sleeve **21** has an external thread engaging an internal thread on the adjacent end of the valve body **13**. The sleeve **21** also has external gear teeth **24** engageable by a pinion **25** on the end of a tool **26**, which rotates the sleeve **21**, causing it to act through its threaded connection with the valve body **13** to produce a tight sealing engagement between the end of the tubular member **11** and an annular seal **27** carried within the valve body **13**.

At the outset, the retainer ring **20** is connected to the sleeve **21** by a shear pin **28**, which aligns the slots **23** in the sleeve **21** with the long legs of the J-slots **19**, which legs extend longitudinally and have open ends at the inner end of the ring **20**. The assembly of ring **20** and sleeve **21** thus pinned together is partially threaded into the valve body **13**, the ends of the threads on the valve body **13** and the sleeve **21** being blunt to facilitate the start of the threading operation. Next, the valve **12** and the pinned assembly of retainer ring **20** and sleeve **21** is applied to the tubular member **11**, so that the lugs **17** therein pass through the slots **23** in the sleeve **21** and the long legs of the J-slots **19** in the retainer ring **20** as far as the bases of the J-slots **19**.

Now the tool **26** is applied through a hole **29** in the valve body **13** so that the pinion **25** engages the gear teeth **24**. The tool **26** is rotated and causes the sleeve **21** and the retainer ring **20** to rotate. During initial rotation the valve **12** is pulled somewhat onto the tubular member **11** and the lugs **17** on the tubular member **11** pass through the bases of the J-slots **19** in the retainer ring **20** to the short legs of the J-slots. During further rotation of the tool **26** the pin **28** shears, since the retainer ring **20** can rotate no further because the lugs **17** on the tubular member **11** are in the short legs of the J-slots **19**, at the ends of the bases thereof in the ring **20**. Said further rotation of the sleeve **21** is continued until the seal **27** in the valve body **13** is brought into engagement with the end of the tubular member **11**.

The sleeve **21** is held on the tubular member **11** by virtue of the contact between the retainer ring **20** and the internal shoulder **22** of the sleeve **21**. The retainer ring **20** cannot be dislodged by being rotated backward, since the pressure of the internal shoulder **22** of the sleeve **21** against the retainer ring **20** keeps the lugs **17** in the short legs of the J-slots **19** in the retainer ring **20**.

The intention is to limit the invention only within the scope of the appended claims.

What is claimed is:

1. For use with a tubular member having attaching lugs and a valve having a thread at one end; an assembly for attaching the valve to the tubular member through the lugs of the tubular member and the thread of the valve, said assembly comprising a short sleeve having an internal shoulder, a thread engaging the thread of the valve, and internal longitudinal slots through which the lugs of the tubular member pass as the sleeve and valve are applied to the tubular member; a retainer ring located within the sleeve and between the sleeve and the valve, one end of the ring axially abutting the internal shoulder of the sleeve, the ring being provided with J-slots having their long legs extending longitudinally with their ends open at the said one end of the ring, the J-slots receiving the lugs of the tubular member; and a shear pin connecting the sleeve and the retainer ring to align the slots of the sleeve with the long legs of the J-slots of the ring; whereby initial rotation of the sleeve rotates the ring into locking position in which the lugs of the tubular member are in the short legs of the J-slots of the ring for locking the ring and sleeve on the tubular

member, and further rotation of the sleeve also acts through the thread of the sleeve and the thread of the valve to shear the pin between the ring and the sleeve and to draw the valve into engagement with the tubular member.

2. For use with a tubular member having attaching lugs and a valve having an internal thread at one end; an assembly for attaching the valve to the tubular member through the lugs thereof and the internal thread of the valve, said assembly comprising a short sleeve having an internal shoulder, an external thread engaging the internal thread on the valve, external gear teeth for rotating the sleeve by a gear type of tool, and internal longitudinal slots through which the lugs on the tubular member pass as the sleeve and valve are applied to the tubular member; a retainer ring located within the sleeve and between the sleeve and the valve, one end of the ring axially abutting the internal shoulder of the sleeve, the ring being provided with J-slots having their long legs extending longitudinally with their ends open at the said

one end of the ring, the J-slots receiving the lugs on the tubular member; and a shear pin connecting the sleeve and the retainer ring so as to align the slots in the sleeve and the long legs of the J-slots of the ring; whereby initial rotation of the sleeve rotates the ring into a locking position in which the lugs on the tubular member are in the short legs of the J-slots in the ring for locking the ring and sleeve on the tubular member, and further rotation of the sleeve also acts through the thread on the sleeve and the thread on the valve to shear the pin between the ring and the sleeve and to draw the valve into engagement with the tubular member.

References Cited in the file of this patent

UNITED STATES PATENTS

283,975	Converse	Aug. 28, 1883
1,115,007	Neumeister	Oct. 27, 1914
1,948,028	Edwards	Feb. 20, 1934
2,194,973	Durant	Mar. 26, 1940
2,863,817	Morris	Dec. 9, 1958