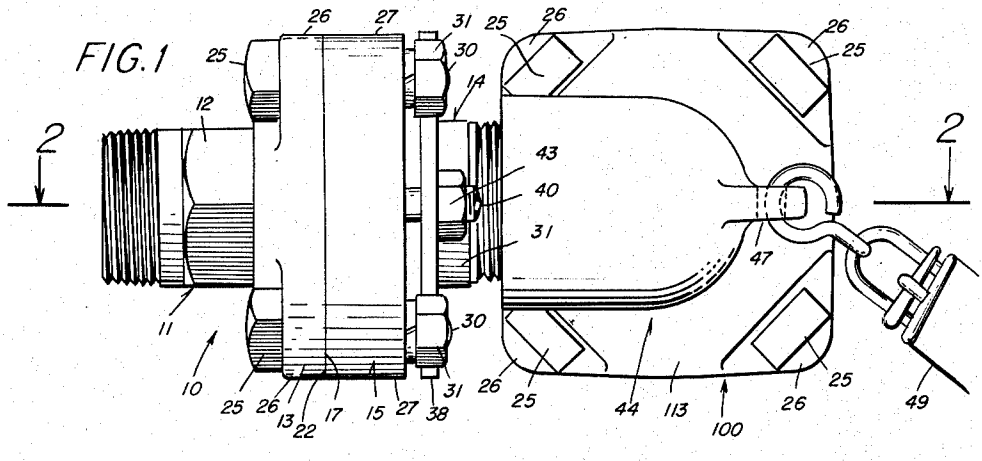
Aug. 25, 1959 J. MORRIS, JR 2,901,273

SWIVEL JOINTS IN CONNECTORS FOR STEAM LINES OF RAILWAY CARS

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FIG. 1



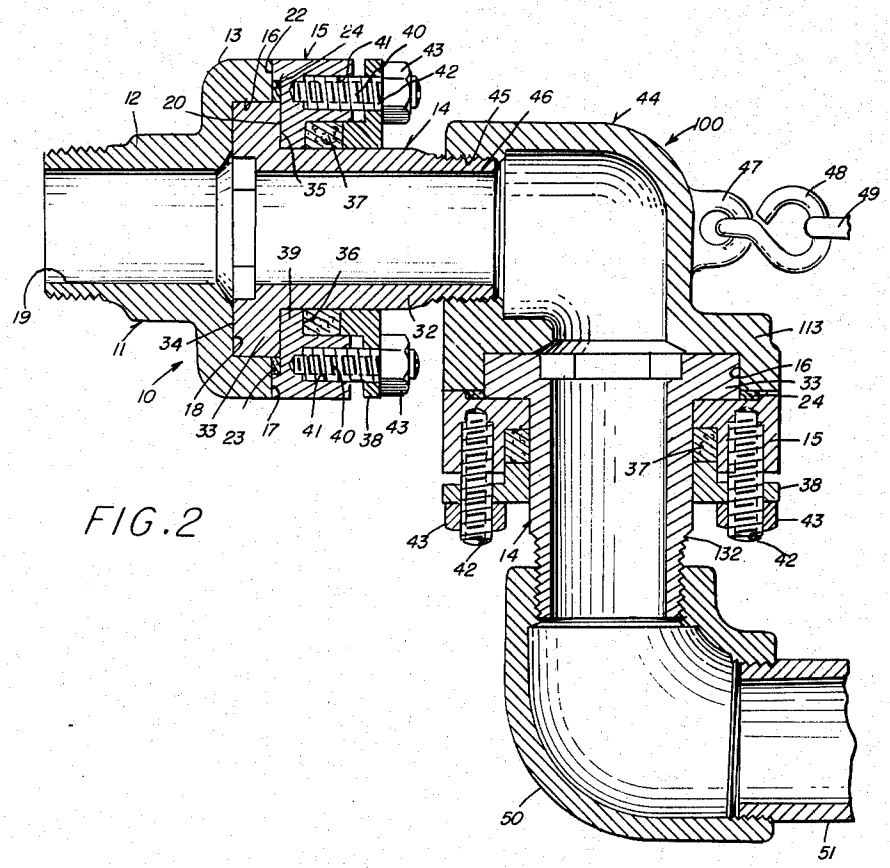


FIG. 2

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SWIVEL JOINTS IN CONNECTORS FOR STEAM LINES OF RAILWAY CARS

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FIG. 4

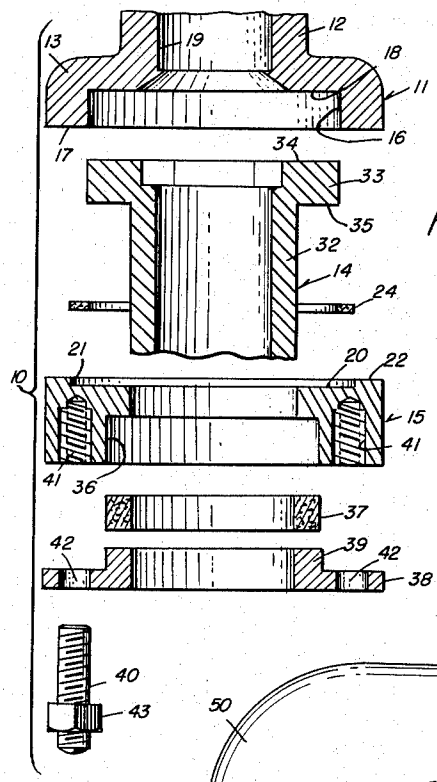


FIG. 3

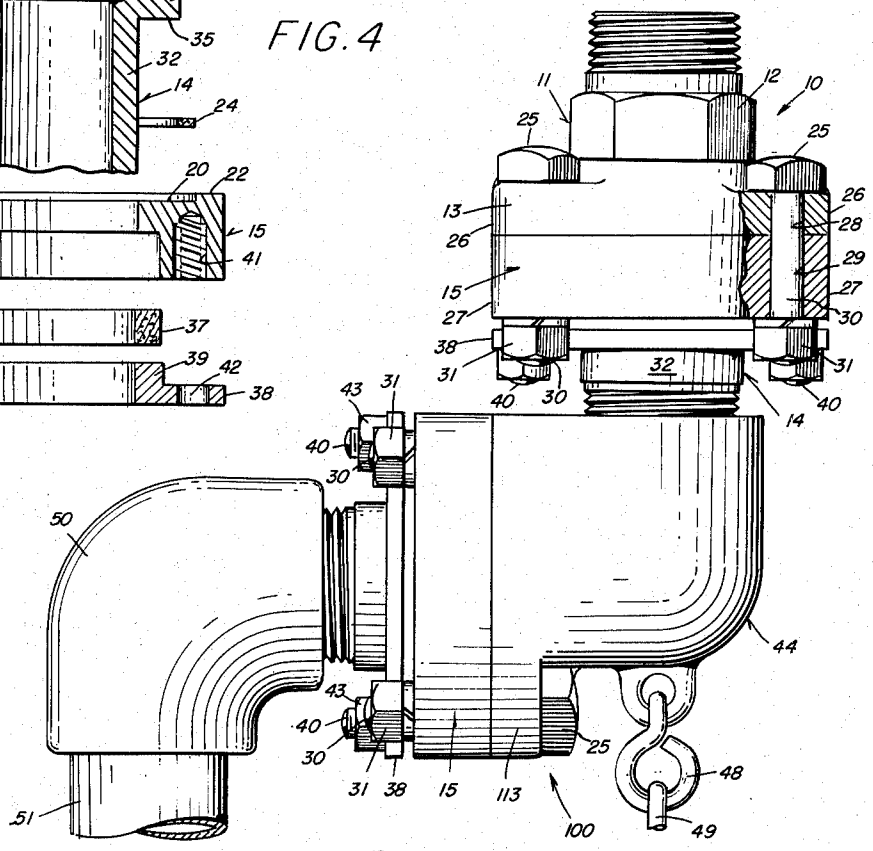
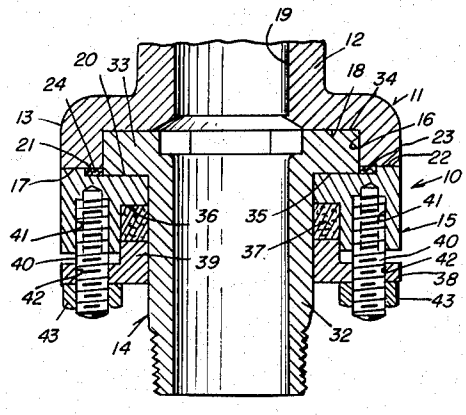


FIG. 5



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2,901,273

SWIVEL JOINTS IN CONNECTORS FOR STEAM LINES OF RAILWAY CARS

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Application February 17, 1958, Serial No. 715,752

1 Claim. (Cl. 285—281)

The present invention relates to swivel joints in connectors for railway car steam heat lines or pipes for conduction of relatively high temperature steam at elevated pressure.

A general object of the present invention is to provide such a connector swivel joint that is of simple construction having few parts readily produced in mass production and easily assembled, which in service avoids obstruction of the flow passage therethrough and effectively shields parts thereof which may be undesirably deteriorated by direct contact with relatively high temperature fluids, particularly if the latter are under high pressure.

A more specific object of the invention is to provide such a connector swivel joint in which gasketing and packing are remote from and outside of the through flow passage while assuring substantially no leakage of carried steam even though the latter be of relatively high temperature and pressure, the structure insuring unusually long and efficient railway car steam pipe connector service life.

Another object of the present invention is to provide such connector swivel joints in forms well suited to service as parts of metallic steam heat line car connection assemblies for service in efficiently connecting together steam train pipes of successive railway cars in an unusually leak-proof manner, these connection assemblies being readily adapted to mounting in either vertical or horizontal positions as may be demanded by existing car constructions and equipment thereof.

A further object of the invention is to provide structural embodiments of the device which are readily and economically constructed and which permit efficient use and operation thereof.

Other objects of the invention will in part be obvious and will in part appear hereinafter.

The invention accordingly comprises the features of construction, combinations of elements, and arrangement of parts, which will be exemplified in the constructions hereinafter set forth, and the scope of the invention will be indicated in the claim.

For a fuller understanding of the nature and objects of the invention reference should be had to the following detailed description taken in connection with the accompanying drawings, in which:

Fig. 1 is an end elevational view of two forms of the connector swivel joint of the present invention assembled to form a sub-assembly suitable for use in a steam heat line car connection assembly;

Fig. 2 is a sectional view of the swivel connectors shown in Fig. 1 taken substantially on line 2—2 thereof, and showing a portion of a connecting pipe section leading to additional connectors of the present invention;

Fig. 3 is a side elevational view, with parts broken away and in section, of the structure shown in Fig. 2;

Fig. 4 is an exploded axial section, with portions broken away, of parts of one of the swivel connectors shown in Figs. 1, 2 and 3; and

Fig. 5 is an axial section, with portions broken away, of the parts shown in Fig. 4, illustrating the assembly thereof.

Prior to the present invention many different types of metallic steam line car connection assemblies have been proposed for service and used with suitable coupler heads to connect together the steam heat pipes of successive railway cars in making up trains thereof. Those most frequently used are characterized by swivel joints in which the gasket elements and springs employed to hold such gasket elements snugly to their seats are located in the through steam passages to constitute obstructions therein and where they are subjected directly to the destructive effects of hot steam at high pressures, the temperatures and pressures thereof commonly being respectively in the ranges of about 360° F. to 417° F. and 160 lbs. per sq. in. to 300 lbs. per sq. in. Excessive steam leakage is characteristic of their services. These difficulties and other problems inherent to additional proposals are efficiently eliminated by embodiments of the present invention as will be clear from the following description of the structures shown in the drawings.

One form of the connector swivel joint of the present invention is illustrated at **10** in Figs. 1, 2 and 3 and in Figs. 4 and 5. As will be seen therein, the connector swivel joint **10** comprises a pipe fitting **11** having an externally threaded nipple stub **12** and an enlarged socketed end portion **13** suitably connected to another pipe fitting **14** by a connecting ring **15**. The pipe fitting **11** may be called an "end valve adaptor."

The enlarged socketed end portion **13** is provided with a counterbored recess **16** circumscribed by a lateral or transversely-extending end seat surface **17** and the bottom face **18** of the socket or counterbored recess **16** provides an internal, lateral or transverse, circular swivel seat which is larger in diameter than the nipple passage **19**.

The connecting ring **15**, which may be referred to as a "swivel plate," serves as a socket or chamber-closing ring and has an inner, lateral or transverse end face **20** providing a lateral or transverse circular swivel seat opposed to and longitudinally spaced from the socket swivel seat **18** of the fitting **11** so as to define therebetween a swiveling chamber having a cylindrical side wall. Preferably the inner end face **20** of the chamber-closing or socket ring **15** is stepped, as is indicated at **21**, to provide an annular land **22** having an internal diameter appreciably greater than the diameter of the socket **16**. Thus, when the land **22** is abutted to the lateral end seat **17** an annular recess **23** is provided by the stepping, which is radially outward of the swivel seat **20**. A suitable gasket ring **24** is seated in the recess **23** and may be of conventional construction, such as asbestos sheathed in aluminum. Suitable means are provided for fastening the connecting ring **15** to the socketed end portion **13** of the fitting **11** and may be in the form of a plurality of bolts **25—25**. Preferably, the socketed end portion **13** is generally rectangular in external shape in a plane parallel to its socket seat **18**, as may be understood from the plan view of the enlarged end portion **113** of a similar swivel connector part, as will be seen in Fig. 1, and connecting ring **15** preferably is of similar rectangular outside shape. Such shape of the parts **13** and **15** provides corner portions or ears **26—26** and **27—27** located radially outward of the swivel seats **18** and **20** as well as of the gasket recess **23** and the gasket **24** therein. The corner projections **26—26** and **27—27** are pierced or provided with through holes **28—28** and **29—29** which extend longitudinally of the connector swivel joint structure **10**, and when these holes are brought to alignment they receive therethrough the shanks **30—30** of bolts **25—25**. Nuts **31—31** on the projecting ends of bolt shanks **30—30** securely fasten the connecting ring

15 to the socketed end portion 13 with the gasket ring 24 compressed in a fluid-tight manner in the gasket recess 23.

Companion pipe fitting 14 also has a nipple stub 32 in the form of a longitudinally-extending hollow body provided with a laterally-extending annular flange 33 rotatably mounted in the swiveling chamber defined by socket 16 and connecting ring 15. This companion fitting 14 may be called a "swivel stud." The opposite lateral faces 34 and 35 of annular flange 33 respectively are opposed to the swivel seats 18 and 20 with relatively close tolerance for rotation thereagainst, and preferably the O.D. of flange 33 is only slightly less than the I.D. of socket 16 so as to avoid undue slop. Also, the O.D. of the longitudinally-extending hollow body portion 32 of companion fitting 14 is preferably only slightly less than the I.D. of the inner end portion of the connecting ring 15 which provides swivel seat 20.

In accordance with the present invention, stuffing box means are provided for packing the connector swivel joint structure 10. For this purpose, the connecting ring 15 is provided with a circular socket 36 in its outer end, such as by means of a counterbore, to define an annular packing recess. A ring or annulus 37 of suitable packing material is mounted in the packing recess 36 and initially its I.D. may be only slightly greater than the O.D. of the longitudinally-extending hollow body portion 32 of the companion pipe fitting 14, so as to assure ready insertion of the latter through the former in assembling the parts while requiring a minimum of compression to swell the packing ring in the packing recess to form a fluid-tight joint. An annular gland ring 38 is arranged concentrically about the hollow body portion 32 of companion pipe fitting 14 and has an end portion or axially-extending flange 39 telescoped into the packing recess 36 against the packing ring 37 mounted therein. Annular gland ring 38 may be called a "packing gland." Suitable means are provided for fastening the gland ring 38 to the connecting or socket ring 15 with pressure applied to the packing ring 37 thereby, and such means may be in the form of a pair of stud bolts 40, 40 threadably mounted in internally-threaded sockets 41, 41 in the outer end of connecting or socket ring 15 radially beyond the packing recess 36. The outer ends of stud bolts 40, 40 are received through holes 42, 42 in gland ring 38 radially outward of axial pressure-applying flange 39. Nuts 43, 43 on the outer ends of stud bolts 40, 40 are tightened up to force the gland ring 38 axially inward so as to apply by means of its axial flange 39 pressure to packing ring 37 in packing recess 36, thereby causing the packing ring to swell radially for pressure contact with the walls of the packing recess and the cylindrical outer wall of the longitudinally-extending hollow body portion 32 of companion pipe fitting 14, so as to effect the desired fluid-tight joint.

The stuffing box or packing ring 37 may be made of a variety of materials suitably chosen to resist the deteriorating effects of the conditions of the site of such connector swivel joint structure 10. For example, in the use of a form of the present connector swivel joint for a steam heat line car connection assembly, the material from which packing ring 37 is formed should be able to stand up well under elevated temperatures up to about 500° F. and to withstand relatively high pressures of upwards of 300 lbs. per sq. in., and it may have to advantage certain lubricating properties.

In Figs. 1, 2 and 3, the connector swivel joint structure 10 is shown connected to a companion connector swivel joint structure 100 of the present invention, which is similar in many respects. The chief difference between connector swivel joint structures 10 and 100 will be noted to reside in the fact that for the pipe fitting 11 an elbow pipe fitting 44 is submitted. As will be best understood from Fig. 2, elbow fitting 44 is provided with an internally-threaded hole 45 which threadably receives therein externally-threaded end 46 of companion pipe fitting 14, and the elbow fitting is provided with an enlarged socketed end portion 113 similar to the socketed end portion 13 of pipe fitting 11. Such elbow fitting 44 may be called an "elbow flange." The remaining parts of the connector swivel joint structure 100 are similar to or like those of the remaining parts of the connector swivel joint structure 10. For purposes of the intended services in steam heat line car connection assemblies elbow fitting 100 may be provided with an eye 47 to which may be anchored by an S-shaped link 48 one end of a suspension spring 49.

When it is desired to employ to advantage connector swivel joint structures of the present invention illustrated in the drawings as sub-assemblies in a steam heat line car connection assembly the paired connector swivel joint structures 10 and 100 may be connected by an elbow fitting 50 and a pipe section or long nipple 51 to a pair of successively-arranged connectors swivel joint structures like that illustrated at 100. The stub nipple of the last such connector swivel joint structure, similar to that shown at 132 in Fig. 2, may be connected by a suitable sleeve coupler to a pipe section or long nipple which in turn is connected to the coupler head, and the other end of the suspension spring 49 may be connected to this sleeve coupler for adjustable support of the paired connector swivel joint structures 100, 100 and the coupler head. Fitting 11 will be connected to the car pipe. The unusually trying conditions of the service of steam heat line car connection assemblies are effectively accommodated by the use therein of the illustrated embodiments of the connector swivel joint structure of the present invention. Unusually long service life with elimination of substantial leakage of pressure steam at swivel joints is assured.

It will thus be seen that the objects set forth above, among those made apparent from the preceding description, are efficiently attained and, since certain changes may be made in the above constructions without departing from the scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the following claim is intended to cover all of the generic and specific features of the invention herein described, and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

In a pipe connector assembly for railway car steam heat lines to conduct flow therethrough of steam at elevated temperatures and pressures destructive to packing materials and other elements characteristic of the swivel joints of conventional connectors for such service, a connector swivel joint comprising, in combination; a pipe fitting having a longitudinal, cylindrical through passage for flow therethrough of railway car high pressure heating steam and a concentric socketed end portion arranged about the passage and having a cylindrical socket of certain internal diameter, said socketed end portion providing a lateral end seat and an internal, lateral, circular swivel seat at the bottom of the socket spaced longitudinally inward of said end seat with said seats arranged concentric of the passage; an annular socket closing ring having a stepped inner end face providing an annular land abutted to said lateral end seat and an annular gasket ring recess radially inward of said land between the lateral end seat of said socketed end portion and the inner end face of said ring arranged concentrically with respect to the through steam passage, said socket closing ring having an inwardly-extending lateral, circular, seat-defining portion of certain internal diameter with one circular lateral face thereof constituting a ring swivel seat opposed to and longitudinally spaced from said circular swivel seat of said pipe fitting to define with said socketed end portion between said swivel seats a swiveling cham-

ber concentric with the through steam passage and opened on the radially-inward side thereof to the through steam passage by an annular, longitudinally-extending, entry space, the opposite circular lateral face of said ring seat-defining portion constituting a bottom, lateral, circular packing recess seat longitudinally spaced from said ring swivel seat; a gasket ring mounted in the gasket ring recess and compressed between the lateral end seat of said pipe fittting socketed end portion and the inner end face of said socket closing ring; tightening means anchoring said socket closing ring to said pipe fitting socketed end portion with said gasket ring clamped therebetween in its recess radially inward of the annular land; said socket closing ring having its outer end provided with a longitudinally-extending circular socket arranged concentrically with respect to and of limited depth terminating at said bottom, lateral, circular packing recess seat with the socket being of an internal diameter appreciably greater than the internal diameter of said ring seat-defining portion to define an annular packing recess; a companion pipe fitting having a longitudinally-extending, cylindrical hollow body portion provided with a longitudinal, cylindrical through passage for flow therethrough of railway car high pressure heating steam communicating and coaxially aligned with the through passage of said first pipe fitting and carrying thereon a laterally-extending, exterior circular flange rotatably received through said annular entry space into said swiveling chamber and of an external diameter slightly less than the internal diameter of the chamber socket with the cylindrical side wall of the latter juxtaposed to the circumferential edge of said flange, said annular flange having a pair of opposite, longitudinally-spaced, lateral bearing faces respectively opposed to said chamber swivel seats and seated in bearing contact thereof with relatively close tolerance for rotation against both of said swivel seats, said cylindrical hollow body portion of said companion pipe fitting being of an external diameter slightly less than the internal diameter of said seat-defining portion of said socket ring and extending out through the latter and its packing recess in relative rotary relation thereto; a ring of packing material mounted in said packing recess in annular contact with said hollow body portion and against said bottom lateral seat of said packing recess; an annular gland ring mounted about said hollow body portion and having an axially-extending, cylindrical end flange slidably telescoped into the open outer end of said packing recess against said packing ring; and pressure-applying, adjustable means fastening said gland ring to said socket closing ring and forcing said gland ring longitudinally against said packing ring with compression of the latter against said packing recess bottom seat and snugly about said hollow body portion in a gasket-tight seal.

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UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 2,901,273 August 25, 1959

John Morris, Jr.

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

In the grant, lines 2 and 12, and in the heading to the printed specification, lines 4 and 5, name of assignee, for "Chemical Appliances, Inc.", each occurrence, read -- Chemical Appliances Incorporated --; in the printed specification, column 1, line 61, before "to form" insert -- together --; column 2, line 13, for "drectly" read -- directly --; column 3, line 72, for "submitted" read -- substituted --.

Signed and sealed this 12th day of April 1960.

(SEAL)

Attest:

KARL H. AXLINE
Attesting Officer

ROBERT C. WATSON
Commissioner of Patents