F. H. RICHARDS.

PIPE LINE CONNECTING MECHANISM.

APPLICATION FILED MAR. 17, 1916.

1,194,236. Patented Aug. 8, 1916.

Fig. 1.

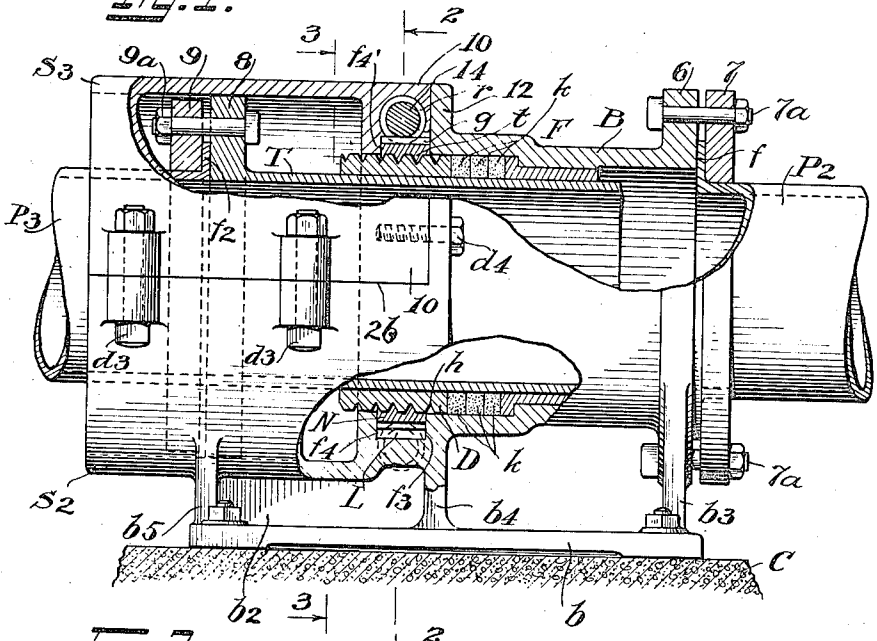


Fig. 2.

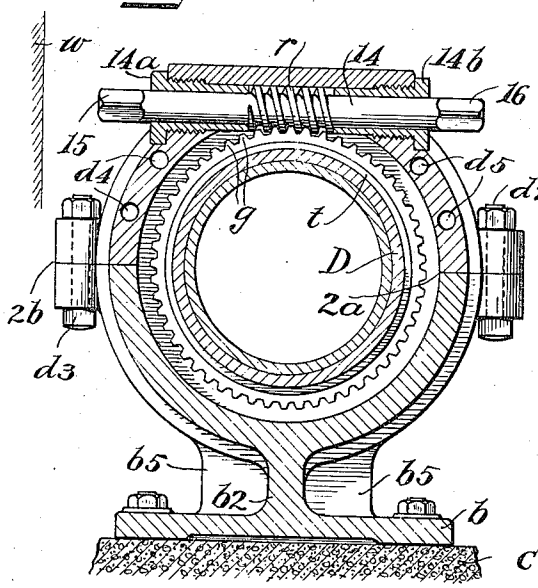


Fig. 3.

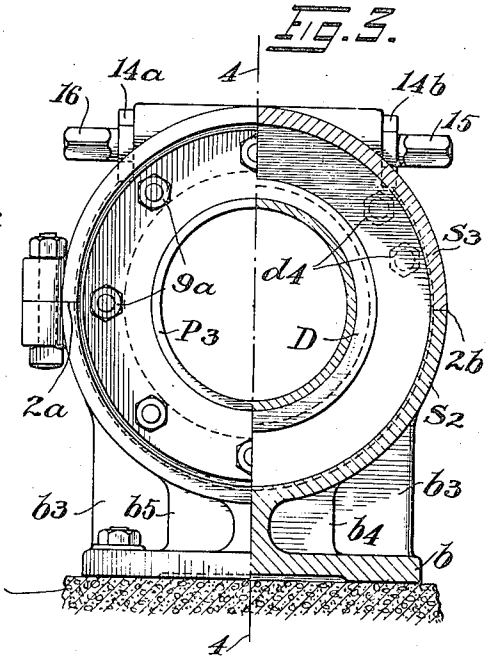
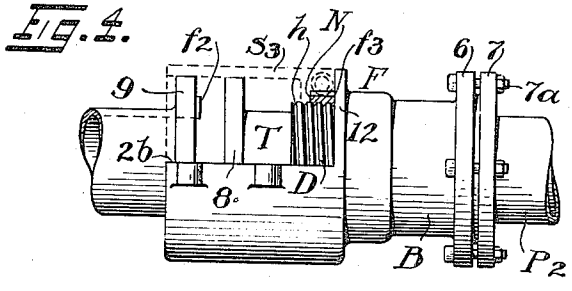


Fig. 4.



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PIPE-LINE-CONNECTING MECHANISM.

1,194,236. Specification of Letters Patent. Patented Aug. 8, 1916.

Application filed March 17, 1916. Serial No. 84,846.

To all whom it may concern:

Be it known that I, FRANCIS H. RICHARDS, a citizen of the United States, residing in Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Pipe-Line-Connecting Mechanism, of which the following is a specification.

This invention relates more especially to that class of pipe-line-connecting devices or mechanisms which comprise therein a slidable tubular member having on one and the outer end thereof a guided head arranged for connecting directly with one of the pipe sections of a pipe-line.

A principal object of the invention is to furnish a simple, durable and efficient device of said class, comprising an improved guiding means and also comprising an expansion-joint provided with packing means of an improved construction and arrangement whereby to secure parallelism of the packing-compressing gland-ring during the movements thereof for adjusting the packing, as hereinafter more fully set forth.

In the accompanying drawing forming a part of this specification, Figure 1 is a side elevation of my improved pipe-line device, some parts being shown with portions thereof broken away to about a central plane for more clearly illustrating certain details of construction. Fig. 2 is a cross sectional view on the line 2—2, Fig. 1, and shows the parts at the left hand of said line as seen from a point at the right hand thereof; in this view, some of the operative details are not shown in section, although located in the plane in which this view is taken. Fig. 3 is a view in which the portion thereof at the left hand of the dotted meridian line 4—4 is an end elevation as seen from the left hand in Fig. 1, and in which the portion thereof at the right of said meridian line is shown broken away to about the line 3—3, Fig. 1, for more clearly showing certain features hereinafter described. Fig. 4 is a side view similar to Fig. 1 but on a smaller scale, for further illustrating certain of the operational and other features hereinafter more fully explained.

Similar characters designate like parts in all the views.

In Figs. 1 and 4, the framework of the mechanism is designated in a general way by F, and (in the form thereof shown in the drawings) comprises as the principal members thereof, a packing-cylinder, as B, and the lower slideway segment, S^2, upon which the upper slideway segment, S^3, is removably secured. Thus the segments S^2 and S^3 together form a head-guiding slideway which is herein shown in the preferred form of a guide cylinder, and which as a whole I designate as the "slideway S", or as the "guide-cylinder S". This guide-cylinder, S, is shown divided longitudinally thereof on the lines 2^a, 2^b, into the two said segments S^2, S^3. On the right-hand end thereof, the packing-cylinder, B, may have an ordinary flange, as 6, whereby to connect the frame or casing F with a pipe section, as P^2, in any suitable or well-known manner. One such way is to form on said pipe, a flange, *f*, which is clamped to the casing by a ring 7 and bolts 7^a.

The tubular pipe-line member T is slidably supported at the right-hand end thereof within the packing-cylinder B, and at the left-hand thereof is provided with a flange-form annular head, 8, to which the other pipe-line section P^3 may be removably attached by means of the pipe-flange f^2, ring 9 and bolts 9^a. In practice, the clamp-ring 9 is preferably of the same outside diameter as the head-ring 8, so that the member T and the pipe P^3 will each be directly supported by the segment S^2, when united as in Fig. 1 and also when, as in Fig. 4, these members, (after the removal of the fastening devices) are slid apart. For the purposes here indicated, of course, the ring or head 9 may be regarded as belonging to,—as being an appurtenant of,—the pipe-section P^3, and hence as constituting the head of said pipe-section; but in a similar manner, the flange or head 8 may be considered as a guided-head for each (and both) of said members T and P^3.

Pipe-line devices of the slidably-connected class are especially necessary when

the pipe is of large size, and in power-plants and heating-plants, pipe diameters of from one to two feet are now frequently required. In such instances, the great weight of the apparatus, especially when filled with water, renders it desirable to have the expansion-joint device or connection provided with a base suitable for resting on a concrete or other foundation, as C, Figs. 1, 2, 3. Accordingly, I have herein shown how the main member or frame, F, may be provided with a support comprising a base-plate b, which may be connected,—preferably in an integral manner,—with the lower slideway or cylinder segment S^2 by a longitudinal web, as b^2, and with the tubular "packing-cylinder" portion B by a transverse web, as b^3. Other transverse suitably-disposed webs, as b^4 and b^5, may be added according to the requirements in any particular instance. While the form and arrangement as here described, of said supporting-parts, is regarded as being favorable for economical manufacture, and as being especially adapted for use when the pipe-line is to be located near a floor, it is to be understood that such supporting means is not an essential part of any combination which comprises coacting operable members of the apparatus, and that in practice said base and the connecting web or webs may be one or more of them modified in arrangement, or may be omitted.

In the mechanism herein illustrated, the gland-ring D is shown formed without the usual flange, and is not operated by bolts, but by means of a ring-nut N, which has inner threads,—as indicated at t,—which engage in corresponding screw threads, h, formed in the outside of the gland-ring. This ring-nut, N, is thus held in place as regards axial position, by being carried upon the gland-ring D. For holding said nut N in proper position longitudinally of the mechanism, said nut is preferably located within an annular channel, as L, (Fig. 1), between the pair of parallel faces f^3, f^4, of the frame member F. The rearward face f^3, of said pair is herein shown extending through a complete circle, while the forward face f^4 extends through only about one-half of a circle upon the frame F, the upper part of this face, $f^{4'}$, (Fig. 1) being formed on the upper segment, S^3, of the guide cylinder S. In this arrangement, the segment S^3 may be extended over the nut N, (as at 10, Fig. 1), so that on removing the part S^3 the nut N may be lifted out of the channel L, if and when the gland-ring D shall have been first withdrawn from within the nut; in this retracted position of said ring D, (not shown in the drawing), of course the ring will be withdrawn to the left-hand of the face f^4 in Fig 1.

When the guide-cylinder, as here illustrated, is divided upon horizontal lines at 2^a, 2^b, the two segments S^2 and S^3 together form a complete cylinder, or split-sleeve, in which the head, as 8, of the tubular member T is fitted to slide longitudinally of the mechanism. The cover portion S^3 of the guide-cylinder may be removably secured in place by any suitable holding devices, but I prefer to employ for this purpose a holding means arranged in two ways, one for holding the cylinder-cover S^3 downwardly onto the lower portion S^2, and another for holding said cover in proper position longitudinally of the frame or main portion of the mechanism. For the first of said holding means, I have herein illustrated a series of bolts as d^2, d^3, arranged at convenient locations on the two sides of the split-cylinder, the bolts passing through ears suitably proportioned and arranged therefor. This variety of holding devices being well-known in the art, a more detailed description is evidently not required in view of the illustration thereof in the drawing. For holding the said cylinder cover S^3 in proper longitudinal position, two bolts are shown or indicated at d^4, d^5, for clamping the rearward end 10 of the cover S^3 firmly against the transverse wall 12 of the frame F. By removing the several bolts here described, the cover S^3 may be lifted directly off from the frame and thus exposing the packing ring nut N, the sliding tubular member D and the guiding head rings 8, 9, as illustrated in Fig. 4.

Generally in this class of devices, the compressible packing, as k, (Fig. 1) is pressed into place, and compressed to the proper density, by a gland-ring having an outwardly-extending flange (not herein shown) through which a series of bolts are arranged for operating the gland. In this well-known gland construction, the flanged gland-ring is usually drawn up against the packing material by a series of six bolts which are separately operable. This mode of operation has several objections, of which a serious one is the practical difficulty of drawing up all of the bolts equally, and as a result such a gland-ring especially when of a relatively large diameter in proportion to the length thereof, is nearly always skewed or strained out of proper or exact alinement, thereby causing the ring to bear imperfectly upon the sliding tubular member, T. Another objection is the relative inaccessibility of some of the bolts when the pipe-line is located near a ceiling or close beside a vertical wall, positions which in practice, are often necessary.

The ring-nut N may be operated in a convenient manner by means of a simple worm and gear arrangement, the operation of which will be obvious to the practical mechanician from a comparison of the several figures of the drawing. The ring-nut

N is here shown formed with gear-teeth, as *g*, on the outside thereof, and a worm-shaft 14 is located for the worm or thread *r* thereof to engage with said teeth *g*. When this kind of actuator device is employed, the shaft 14 may be removably held in place by two bearing-sleeves, as 14^a, 14^b, screwed into a bore formed in the cap-member S^3. In practice it is convenient to have the shaft 14 provided with operating stems, 15, 16, projecting outwardly from said bearings 14^a, 14^b, respectively, so that the nut N may be turned by means of a suitable wrench or crank applied (in a well-known manner) to said shaft on either side of the apparatus. This construction provides in advance for a convenient operation of the gland-ring, whichever side of the apparatus may be the more accessible. For instance, if the pipe-line be located close to the face of a wall represented by the line *w*, Fig. 2, the stem 16 of said shaft 14 will be accessible, while the opposite stem 15 will be unused. Therefore the mechanisms when equipped as described may be sent out by the manufacturer for installation in any ordinary position, without considering whether they are to be set up one side or the other near a wall or post.

As will be evident from Fig. 1, the framework of the mechanism comprises the packing-cylinder portion which is shown at the right-hand, and the guide-cylinder portion which is shown in the left-hand part of said view. The guide-cylinder being of the divided, or split construction, (as already explained), and being also of a much larger diameter than the packing-cylinder, it follows that when the guide-head is drawn well outward, (as indicated in Figs. 1, 4), and when the cylinder-top S^3 is then removed (see Fig. 4), the tubular member T will be directly accessible, so that the ring-nut N may be operated by an ordinary spanner-wrench, and the compression ring D withdrawn for thereby giving ample access to the packing-chamber for repair or renewal of the packing, as *k*, contained therein. Also, when the cylinder-top S^3 is thus removed, the guide-hand flanges 8, 9, are accessible for removal of the clamping bolts 9^a, so that the tubular member T may be slid back, away from the pipe-flange 9, (Fig. 4), while both the head-flange 8 of the member T and the pipe P^3 are each supported by the lower half S^2 of the guide-cylinder. Thus my present improvements provide important advantages over those kinds of pipe-line joints or connections now in the market in which the entire guide-cylinder has to be removed for giving sufficient access to the tubular sleeve and to the packing devices and chamber.

The two members or segments S^2, S^3, together constitute a slideway which is preferably of a truly circular form in cross-section, since this allows the flange-form head, as 8, of the tubular member T, to rotate as well as to slide in this slideway portion of the device. The lower one, as S^2, of these slideway-segments constitutes a part of a casing,—in the nature of a frame,—which also includes the packing-cylinder D. The other of said slideway-segments being removably secured to said casing or frame, thereby forms a slideway-member and also a cap-segment for protecting and (by removal) giving access to said tubular member and the gland-ring which, as already explained, is slidable in the packing-chamber of the packing-cylinder. Thus it will be understood that the term "cylinder" as herein employed for descriptive and definitive purposes, is used in a customary and relatively generic sense, and does not require that the inner cross-sectional line or contour shall actually, in all cases, be a circle or be truly circular, but only to be of a configuration such as to provide for the functional and organic relations being secured or maintained substantially as or in the manner herein set forth.

Having thus described my invention, I claim—

1. In a pipe-line device of the character described, the combination with a packing-cylinder having therein a packing-chamber and provided with packing-adjusting devices, of a tubular member having one end thereof slidable in the packing-chamber and having an annular head on the outer end thereof, and a head-guiding cylinder in axial alinement with the packing-cylinder and comprising two cylinder-segments separated on lines longitudinally of the cylinder, one of said cylinder-segments being a fixed segment constituting a part of a casing which also includes the packing-cylinder, and the other of said cylinder-segments being removably secured to the casing and thereby forming a removable cap-segment for closing-in and for giving access to the cylinder-space between said annular head and the packing-adjusting devices.

2. In a pipe-line device of the character described, the combination with a packing-cylinder having therein a packing-chamber and provided with packing-adjusting devices, of a tubular member having one end thereof slidable in the packing-chamber and having an annular head on the outer end thereof, and a head-guiding cylinder in (axial) alinement with the packing-cylinder and comprising two cylinder segments separated on lines longitudinally of the cylinder and having circular-arc guide-faces, one of said cylinder-segments being a fixed segment constituting a part of a casing which also includes the packing-cylinder, and the other of said cylinder-segments being removably

secured to the casing thereby to form a complete head-guiding cylinder and also to form a removable cap-segment for closing-in and for giving access to the cylinder-space between said annular head and the packing-adjusting devices.

3. In a pipe-line device of the character described, in combination, a packing-cylinder having therein a packing-chamber and packing-adjusting means including a gland-ring and gland-ring-actuating means, a tubular member having one end thereof slidable in the packing-cylinder and in the gland-ring and having extending outwardly from the other end thereof a flange-form head, and a head-guiding slideway comprising two slideway-segments having head-engaging surfaces in longitudinal alinement with said tubular member, one of said slideway-segments constituting a part of a casing which also includes the packing-cylinder, and another of said slideway-segments being removably-secured to the said casing and thereby forming a slideway-member and also a cap-segment for protecting and giving access to said tubular member and the gland-ring.

4. In a pipe-line device of the character described, in combination, a packing-cylinder having at one end thereof pipe-connecting means, and at the other end thereof having packing-adjusting means including a gland-ring and gland-ring-actuating means, a tubular member having one end thereof slidable in the packing-cylinder and in the gland-ring and having extending outwardly from the other end thereof a flange-form head, and a head-guiding slideway comprising slideway-segments having head-engaging surfaces in longitudinal alinement with said tubular member, one of said slideway-segments constituting a part of a casing which also includes the packing-cylinder, and another of said slideway-segments being removably-secured to the said casing and thereby forming a slideway-member and also a cap-segment for protecting and giving access to said tubular member and the gland-ring.

5. In a pipe-line device of the character described, in combination, a packing-cylinder having at one end thereof pipe-connecting means, and at the other end thereof having packing-adjusting means including a gland-ring and gland-ring-actuating means, a tubular member having one end thereof slidable in the packing-cylinder and in the gland-ring and having extending outwardly from the other end thereof a flange-form head, and a head-guiding slideway comprising two complemental slideway-segments having head-engaging surfaces in longitudinal alinement with said tubular member, one of said slideway-segments constituting a part of a casing which also includes the packing-cylinder, and another of said slideway-segments being removably-secured to the said casing and thereby forming a slideway-member and also forming a cap-segment which extends over the said gland-ring actuating means, and arranged for giving access to said tubular member, the gland-ring and said actuating means.

6. In a device of the character described, in combination, a casing comprising a packing-cylinder and having at one end thereof one head-guiding segment of a relatively larger guide-cylinder which is located in axial alinement with the packing-cylinder, a tubular member on the end of the other pipe section and slidably disposed in said casing and in the packing-cylinder thereof, an annular head on said tubular member and having a guided support on said guide-cylinder segment of the casing, a cap-segment removably secured to said guide-cylinder segment of the casing, means for releasably holding said cap-segment in position relatively to the packing-cylinder, a gland-ring for the packing-cylinder, a ring-nut for operating the gland-ring and rotatable around the gland-ring and between faces appurtenant to the casing, and means for actuating the ring-nut.

7. In combination with two sections of a pipe-line, a casing comprising a packing-cylinder having at one end thereof means for the attachment thereto of one pipe section, and having at the other end thereof one segment of a relatively larger guide-cylinder which is located in axial alinement with the packing-cylinder, a tubular member on the end of the other pipe section and slidably disposed in said casing and in the packing-cylinder thereof, an annular head on said tubular member and having a guided support on said guide-cylinder segment of the casing, a cap-segment removably-secured to said guide-cylinder segment of the casing, means for releasably holding said cap-segment in longitudinal position relatively to the packing-cylinder, a gland-ring for the packing-cylinder, a ring-nut for operating the gland-ring and rotatable around the gland-ring and between faces appurtenant to the casing, cap-segment, and a ring-nut-actuator carried by the cap-segment and thereby separable from the ring-nut on the removal of the cap-segment.

8. In a device of the character described, in combination, a casing comprising a packing-cylinder attachable to one pipe section, and having at one end thereof one segment of a relatively larger guide-cylinder which is located in axial alinement with the packing-cylinder, a tubular member attachable to another pipe section and slidably disposed in said packing-cylinder, an annular head on said tubular member and having a guided support on said guide-cylinder segment of the casing, a cap-segment removably secured

to said guide-cylinder segment of the casing, means for releasably holding said cap-segment in a fixed position on the casing, a gland-ring for the packing-cylinder, a ring-nut for operating the gland-ring and rotatable around the gland-ring and between faces appurtenant in part to the casing and in part to said cap-segment, and a ring-nut-actuator carried by the cap-segment and thereby separable from the ring-nut on the removal of the cap-segment.

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Witnesses:
H. D. PENNEY,
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