W. J. LEIGHTY.

MEANS FOR FORMING COUPLINGS OR JOINTS.

APPLICATION FILED MAR. 11, 1912.

1,093,868.

Patented Apr. 21, 1914.

4 SHEETS—SHEET 1.

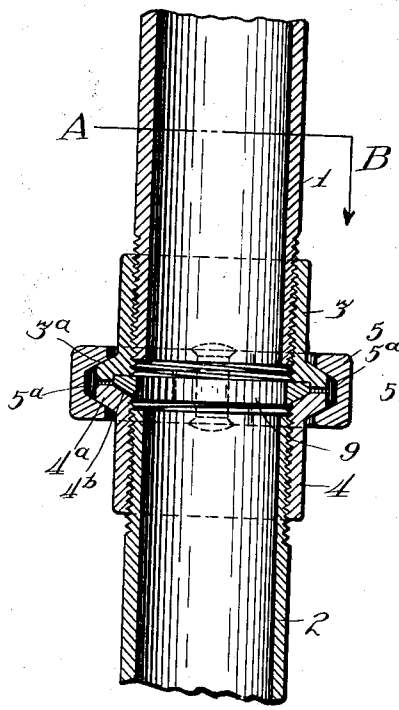

Fig. 1.

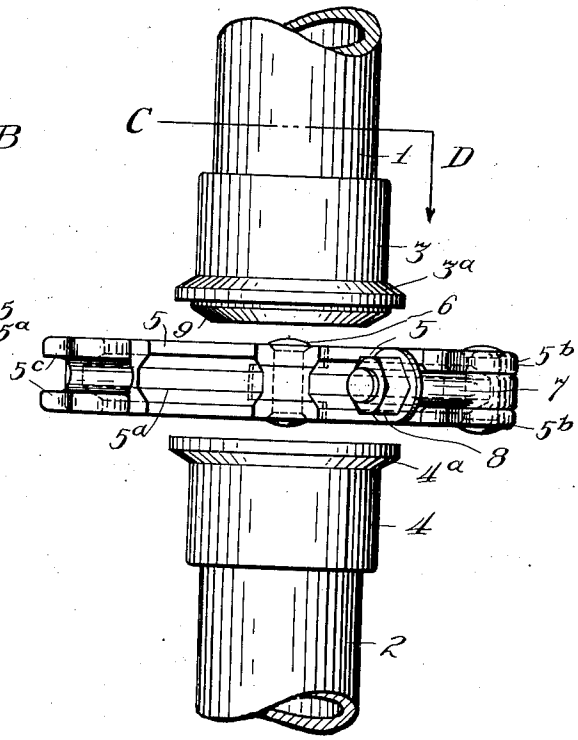

Fig. 3.

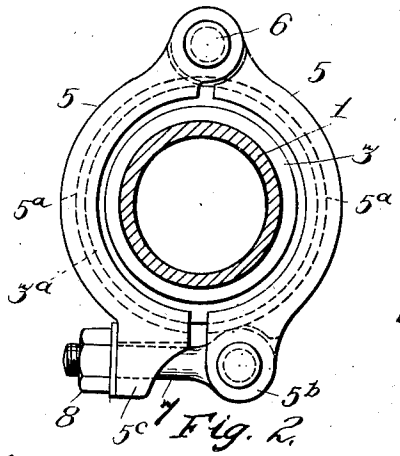

Fig. 2.

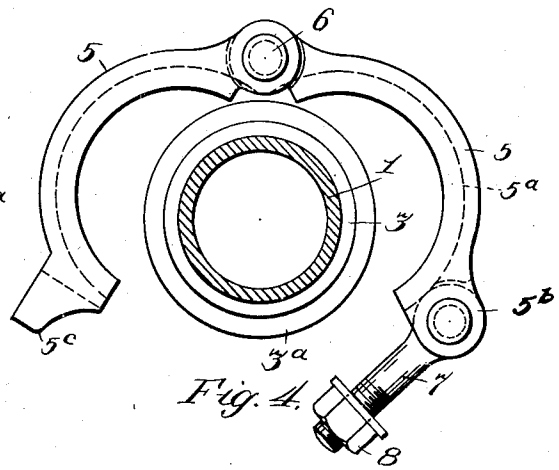

Fig. 4.

Witnesses

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4 SHEETS—SHEET 2.

Fig. 5.

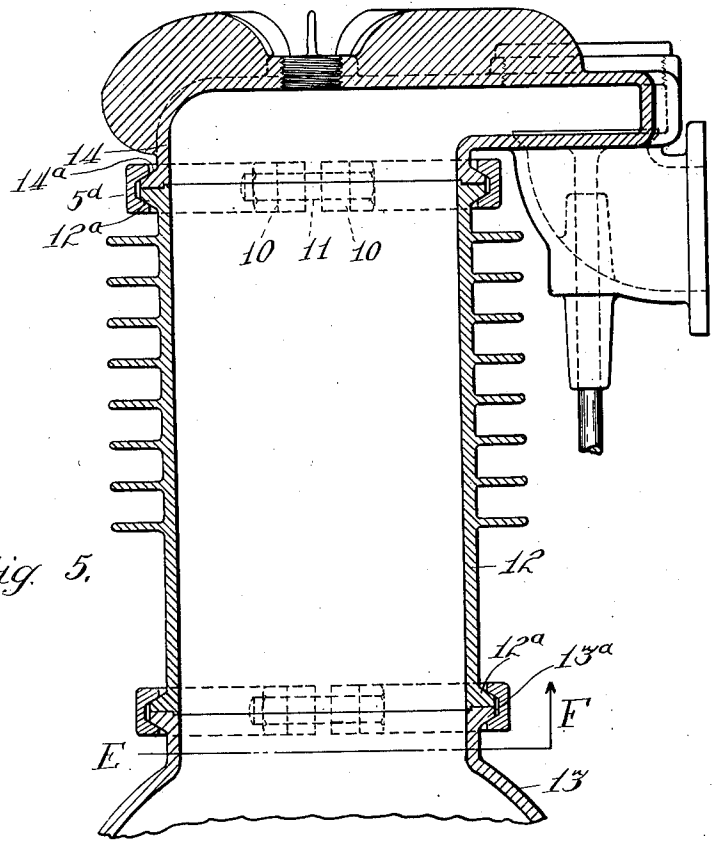
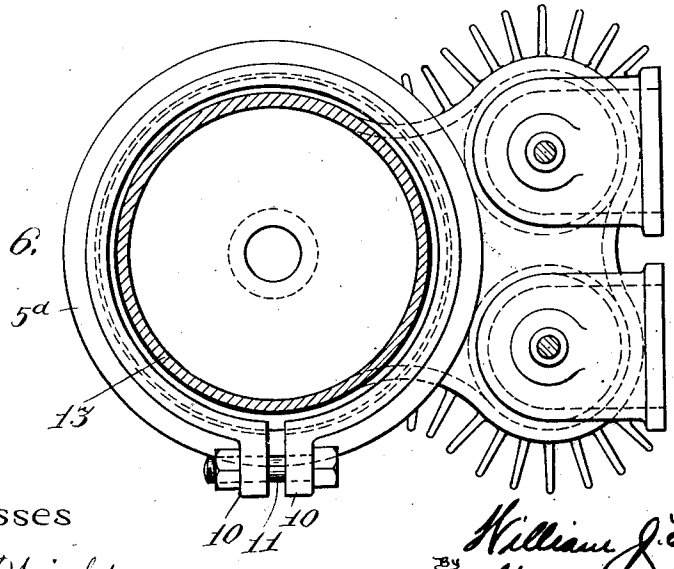


Fig. 6.



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4 SHEETS—SHEET 3.

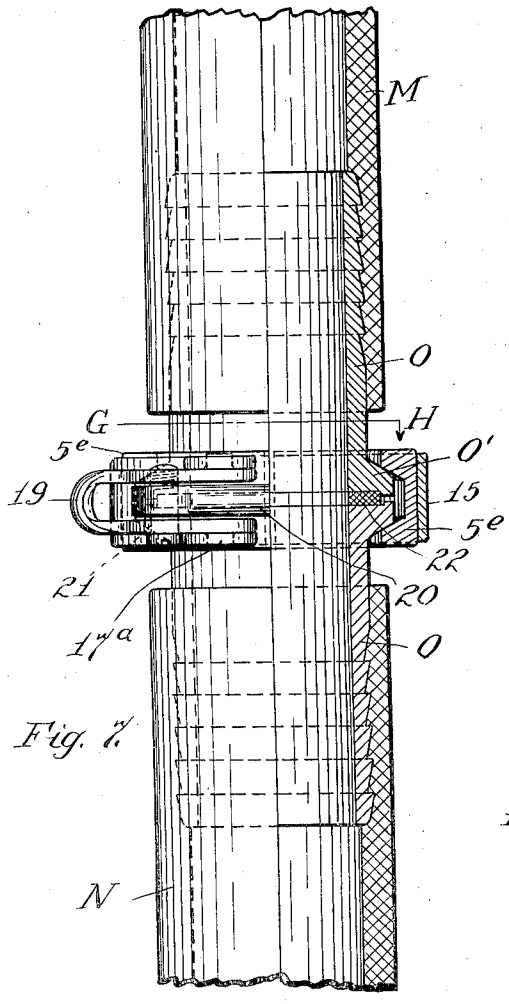

Fig. 7.

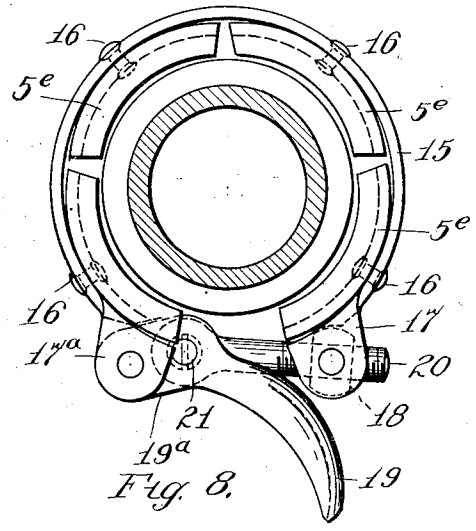

Fig. 8.

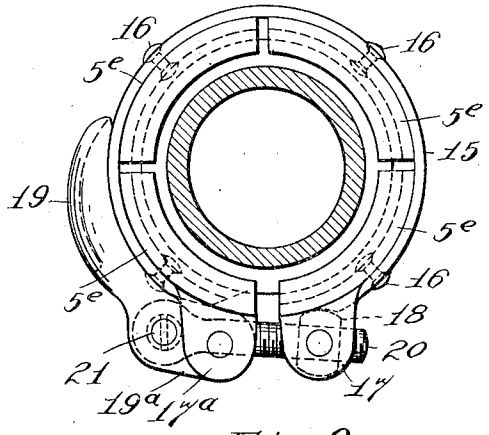

Fig. 9.

Witnesses

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4 SHEETS—SHEET 4.

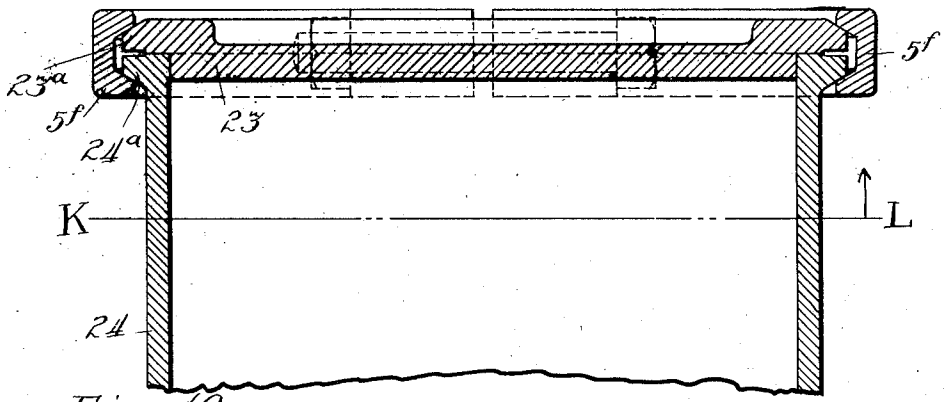

Fig. 10.

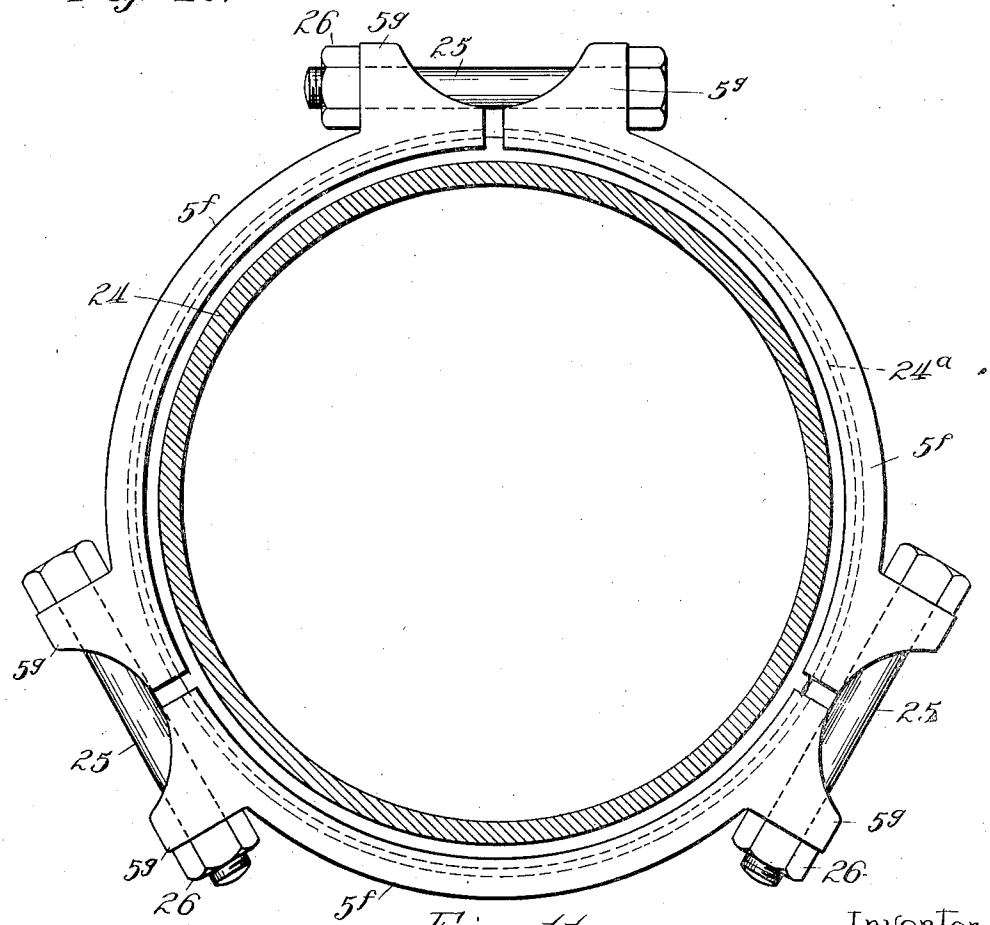

Fig. 11.

Witnesses

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UNITED STATES PATENT OFFICE.

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MEANS FOR FORMING COUPLINGS OR JOINTS.

1,093,868. Specification of Letters Patent. Patented Apr. 21, 1914.

Application filed March 11, 1912. Serial No. 683,112.

To all whom it may concern:

Be it known that I, WILLIAM J. LEIGHTY, a citizen of the United States, and resident of Topeka, in the county of Shawnee and State of Kansas, have invented certain new and useful Improvements in Means for Forming Couplings or Joints, of which the following is a description, reference being had to the accompanying drawings, which form a part of my specification.

My invention relates more especially to means whereby wedged coupling joints may be effected between cylindrical members or several abutting members of the same peripheral form at the point of connection, as for example the ends of hose, pipes, or cylinders.

The object of my invention is to provide means which are simple in construction, economical in manufacture, and which will at the same time be readily adjustable to effect a proper coupling or joint and also permit the joint to be quickly uncoupled.

A further object of the invention is to provide means which will be positive in operation and at the same time durable so as to withstand unusually hard usage without impairing its efficiency, and also whereby uniform pressure will be exerted on all surfaces forming the joint, avoiding the necessity for extra strength in studded joints which is required on account of the springing apart of the faces of the joint between the studs, thereby causing leaks. My improved means not only provides uniform pressure on the joint forming surfaces, but permits of a lighter and more compact construction being employed.

The invention is especially adapted for securing together the abutting ends or walls of any pipe line, cylinder, vessel or receptacle that presents circular or outwardly curved surfaces having flat faces; being, however, equally adapted for mere retaining joints or joints under any required pressure, as will be more fully understood from the following detailed description of the accompanying illustrations.

In the drawings:—Figure 1 is a longitudinal sectional view illustrating my invention in the form of a pipe union, whereby the ends of two portions of pipe are shown coupled together. Fig. 2 is a cross sectional view taken on the line A—B of Fig. 1 and looking downward in the direction of the arrows. Fig. 3 is a side elevation of the construction illustrated in Fig. 1, with the various members separated and opened out. Fig. 4 is a view taken on the line C—D of Fig. 3 looking in the direction of the arrow. Fig. 5 is a longitudinal sectional view of a portion of an internal combustion motor cylinder, illustrating the application of my invention for forming the joints between the crank case and the cylinder and between the cylinder and the cylinder head. Fig. 6 is a cross sectional view taken on the line E—F of Fig. 5, looking in the direction of the arrow. Fig. 7 illustrates my invention in the nature of a hose coupling; the figure being a partial elevation and partial longitudinal sectional view. Fig. 8 is a cross sectional view taken on the line G—H of Fig. 7, looking in the direction of the arrow and illustrating the coupling in unclamped position. Fig. 9 is a similar view illustrating the coupling in closed or clamped position. Fig. 10 is a longitudinal sectional view of a portion of a cylinder, wherein a modified form of my invention is used to clamp the head on the end of the cylinder. Fig. 11 is a cross sectional view taken on the line K—L of Fig. 10, looking in the direction of the arrow and showing the means in operative or clamped position.

The exemplifications of my invention, as shown in the various figures, indicate the adaptability or the general application of my invention to conditions where cylindrical joints, unions or couplings are employed; while the construction shown in Figs. 1 to 4 may be considered as my preferred form.

In Fig. 1, I show a connection between the abutting ends of two tubular members or pipes 1 and 2; the ends being provided with thimbles 3 and 4. The thimbles 3 and 4 may be secured to the ends of the pipes in any suitable manner, but preferably by being screwed thereon as shown. The outer ends of both thimbles 3 and 4, that is the ends which will be brought adjacent to each other, are provided with annular flanges or ribs 3^a and 4^a. The non-contacting portions of the flanges or collars 3^a and 4^a are beveled or tapered toward the body of the thimbles, see Figs. 1 and 3; and one of the thimbles, to wit thimble 4, is also shown provided with the outwardly tapering orifice as clearly shown at 4^b. Clamping means adapted to encircle the flanged ends or col-

lars of the thimbles 3 and 4 are provided, consisting of the parts 5, 5, of a sectional ring; the inner circumference of the sections is provided with a groove 5^a, the sides whereof are oppositely beveled to correspond with the beveled faces on the annular flanges or collars of thimbles 3 and 4. The two ring sections 5, 5, are hinged or pivoted together at 6 in any suitable yet endurable manner; while the opposite end of one of the sections is provided with an eye-bolt 7. This eye-bolt 7 is preferably pivotally secured between the bifurcated end or lobes 5^b, see Fig. 3; and the other or free end of the bolt is provided with suitable nut 8 which screws onto the threaded end of the bolt. The other section 5 of the sectional ring has its free end bifurcated or provided with the parallel lugs 5^c between which the free end of eye-bolt 7 is adapted to extend. The lugs 5^c are so formed as to provide a flat bearing surface for nut 8 when the two sections have been brought together and the bolt placed between the bifurcated end or lugs 5^c. In the construction shown in Figs. 1 and 3, I show one of the thimbles provided with a removable seat 9, one side whereof is beveled to correspond with the beveled orifice 4^b of thimble 4; the member 9 being shown inserted in the countersunk portion surrounding the orifice of thimble 3. In order to clamp the connection or union together, thimbles 3 and 4 are brought into proper alinement and the clamping member or sectional ring 5 closed about the flange or collar on the abutting ends of the thimbles, with the free end of the eye-bolt placed between the lugs 5^c. By screwing nut 8 onto the eye-bolt, the sectional ring will be firmly clamped into place, through the action of the wedge shaped groove 5^a (see Figs. 1 and 3) on the correspondingly beveled but oppositely presented surfaces of the collar or flange portions 3^a and 4^a. Instead of employing the removable seat 9, the adjacent ends of the thimbles 3 and 4 may be otherwise formed so as to provide a tight joint between them after the clamping means has been applied. With the intermediate member 9, it is evident that the forcing together of the thimbles will compel the member 9 to firmly engage the beveled orifice of thimble 4.

In Figs. 5 and 6, I show a modified form of my invention, which is more especially adapted for use in connection with internal combustion motors. In the construction shown in these figures, the clamping means preferably comprises a single member 5^d, provided with the internal wedge shaped groove, formed in the manner previously described in connection with the construction shown in the preceding figures. The ends of the member 5^d are provided with the lugs 10 which are provided with openings through which the adjusting member or bolt 11 passes. The two figures under consideration illustrate my invention employed to form the joints between the cylinder 12 and crank case 13, and between cylinder 12 and the cylinder head 14. As in the case of the thimbles 3 and 4, the abutting ends of the cylinder, the crank case, and the cylinder head are provided with the externally radially extending beveled faces 12^a, 13^a, and 14^a, respectively. These oppositely beveled or tapered faces are engaged by the similarly and oppositely beveled surfaces of the recess or groove in the inner circumference of the members or rings 5^d. The abutting ends of the cylinder, crank case, and cylinder head, may be formed in any suitable manner so as to produce tight connections between them when the clamping member or ring 5^d has been put into place, which is accomplished by springing the clamping rings or members over the external collars or flanges of the respective members, after which the bolt 11 is passed through the lugs 10 and the nut screwed upon the bolt. It is evident from this construction that by screwing up the nut on the bolt, the clamping member or ring will be contracted, whereby the oppositely beveled surfaces will be firmly drawn or clamped together.

In Figs. 7, 8, and 9, I illustrate still another modified form of my invention, wherein the same is especially adapted for use as a hose coupling; its operation being however substantially similar to that shown in Figs. 1 and 4 and previously described. In the construction illustrated in these figures, the clamping member or means comprises a sectional or segmental member, each segment or section 5^e, 5^e, 5^e, 5^e, being provided with a similar wedge shaped groove of the form previously described; the sections being so arranged as to have the grooves coincident with each other; the angle of the grooves corresponding, of course, with the angle of bevel given to the engaging surfaces, in manner similar to that previously described. The sections 5^e are preferably secured to the split band 15 by the rivets 16. The band 15 is provided with the lugs 17 and 17^a at its ends, and is so formed that when the same is in normal condition, the band 15 will maintain or hold the sections 5^e apart in an expanded condition as illustrated in Fig. 8. Pivotally secured between the lugs 17 is an apertured member or nut 18, which is preferably screw threaded, to receive the end of eye-bolt 20. The member or nut 18 may be secured between the bifurcated end of the band 15 in any suitable manner, so as to permit of its oscillation and at the same time allow bolt 20 to swing on its pivotal point at 21. This eye-bolt 20 is removably secured to a lever 19 in any suitable manner as for example by means of a cap screw 21. The

lever 19 is provided with a head portion 19^a which preferably extends between the lugs 17^a, where the lever 19 is pivotally secured in place. By providing the elongated head portion, it permits of the lever being pivoted as stated and also permits of the pivotal connection between eye-bolt 20 and the lever at one side of the pivotal point between the lever and the lugs. By so constructing the lever 19, it is made self-locking either in open position as shown in Fig. 8, or in closed position as shown in Fig. 9, as the movement of the lever about its pivotal connection to the lugs 17^a will move the pivotal connection between the eye-bolt 20 and the lever 19 out of alinement with the pivotal point on the lugs. Pressure will therefore be exerted through the eye-bolt 20 and the nut 18 on the ends of the band or clamping means, and the pressure exerted on the eye-bolt 20 will hold lever 19 firmly against the ring 15 when the clamping means is closed or in clamping position, and will also hold the eye-bolt 20 when open. The clamping means just described may consist of any number of segments desired, but preferably of the number illustrated and arranged in the manner described. The two ends of hose, M and N, are each provided with a thimble O, O, preferably similar in construction as shown in Fig. 7, with their outer ends provided with oppositely beveled collars or flanges O′ which are adapted to extend into the wedge shaped grooves of the different segments of the clamping member as clearly shown in Fig. 7. When desired, the outer ends of the thimbles O may be provided with a countersunk portion surrounding the orifice in which a suitable gasket, as shown at 22, may be placed, thereby insuring a liquid tight connection. If it is desired to increase the pressure exerted by the clamping means, the cap screw 21 may be removed, thereby permitting the eye-bolt 20 to be forced or screwed to a greater extent through apertured member or nut 18, thus shortening the length of the bolt intermediate of the ends of the band, which necessarily will result in greater pressure being applied when lever 19 is swung into the position illustrated in Fig. 9. It is clearly evident from the construction shown in Fig. 9, where the pivotal point between eye-bolt 20 and lever 19 is slightly beyond a dead center, that the pressure exerted will tend to firmly hold the lever 19 against the band 15.

In Figs. 10 and 11, I illustrate another modified form of my invention, as being especially adapted for forming joints between a cylinder of large diameter and its head. In these figures, 23 represents a cylinder head which is provided with the externally tapered or beveled edge 23^a, while the adjacent end of the cylinder 24 is provided with the tapered or beveled flange 24^a. In the construction shown in these figures, the clamping or joint forming means consists of a segmental ring 5^f, which is provided with a tapered or wedge shaped groove in the manner previously described and as clearly illustrated in Fig. 10. The ends of the sections are provided with the lugs 5^g, the one surface whereof is preferably formed so as to provide a flat bearing for the head of the bolts 25 and the nuts 26. The lugs 5^g may either be provided with an aperture extending therethrough to receive the bolts 25, or these lugs may be slotted so as to permit of the bolts being put into proper position. It is evident from the construction shown and described that after the different segments of the clamping ring 5^f have been placed over the beveled flanges 23^a, 24^a, of the cylinder head and cylinder, respectively, pressure can be applied thereto by screwing up the different bolts 25, which tends to reduce the diameter of the ring; the tapered or wedge shaped grooves will permit the different portions or segments to "creep" or move onto the correspondingly beveled or tapered surfaces of the flange portions of both the head and the cylinder. Firm couplings or joints are thus effected without subjecting any of the parts to undue strains; and greater pressure can be exerted without causing a rupture of any of the parts.

I have shown and described various forms of my invention whereby it may be applied to different uses and other modifications may be made without, however, departing from the spirit of my invention; and I do not wish to be understood, therefore, as limiting myself to the exact constructions shown and described, but

What I claim and wish to secure by Letters Patent, is:—

1. Means for forming couplings or joints, comprising a circumferential member which may be expanded or contracted, a series of segmental members secured within the circ-circumferential member and normally spaced apart, said segmental members being provided with wedge-shaped grooves on their inner surfaces, a lever pivotally secured at one end of said circumferential member, a bolt pivotally secured to said lever at a point intermediate of the ends of the lever, and a member pivotally secured to the circumferential member at a point adjacent to the point where said lever is secured, said pivoted member being adapted to receive the other end of said bolt and permit of adjustment lengthwise of the bolt, the relation between the pivotal points of the lever, the bolt, and said last mentioned member being such that movement of the pivotal point of the bolt on the lever toward either side of the pivotal point of the lever on the circumferential member will

contract or expand said circumferential member.

2. Means for forming couplings or joints, comprising a circumferential member which may be expanded or contracted, a series of segmental members secured within the circumferential member and normally spaced apart, said segmental members being provided with wedge-shaped grooves on their inner surfaces, a lever pivotally secured at one end to said member, a bolt pivotally secured to said lever at a point intermediate of the ends of the lever, and a member pivotally secured to the circumferential member at a point adjacent to the point where said lever is secured, said pivoted member being adapted to receive the other end of the bolt and permit of adjustment of the bolt, the relation between the pivotal points of the lever, the bolt, and said last mentioned member being such that movement of the pivotal point of the bolt on the lever toward either side of the pivotal point of the lever on the circumferential member will contract or expand said circumferential member, in combination with means secured at the adjacent ends of the two members to be joined together, provided with outer surfaces substantially similar in peripheral form to the inner periphery of the said segmental members, said outer surfaces and the inner surfaces of the segmental members being correlated and so arranged that contraction of the circumferential member will force the two members together, and a removable member having surfaces corresponding with the inner surfaces of said last mentioned means and adapted to seat between the adjacent ends thereof.

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