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2,299,357

COUPLING FOR RODS AND TUBES

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Fig. 1.

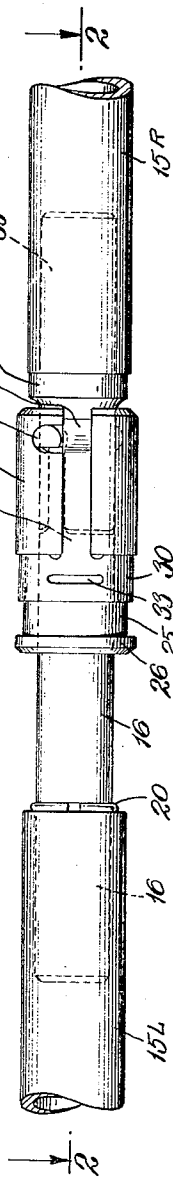


Fig. 2.

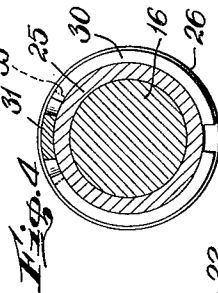
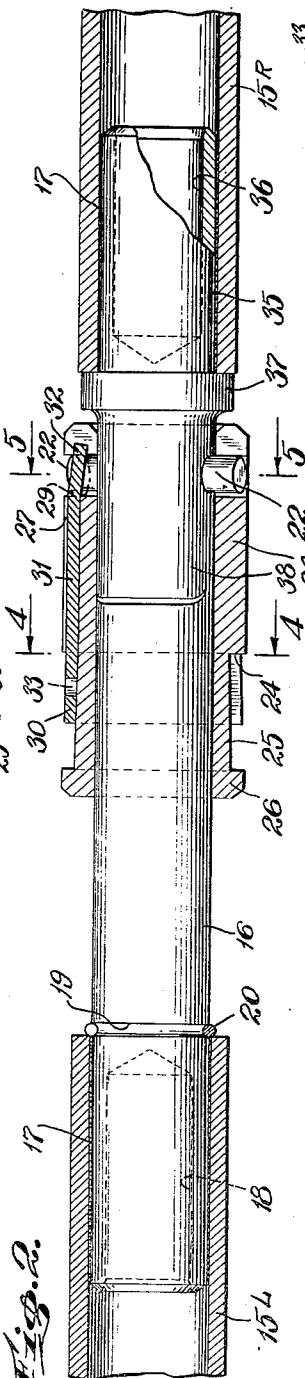


Fig. 5.

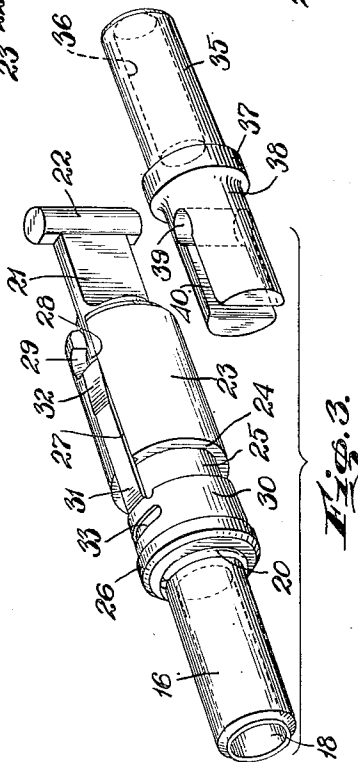
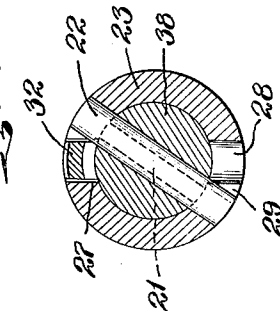


Fig. 3.

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COUPLING FOR RODS AND TUBES

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8 Claims. (Cl. 287—104)

This invention relates to devices for connecting and disconnecting tubes, rods and analogous elements.

There are many conditions in which such parts must be coupled or separated easily and rapidly, particularly in aeroplane installations, and in which the space may be limited to such extent that ordinary methods are inconvenient and inadequate.

It is frequently found that stress rods and the like are necessarily disposed in positions substantially inaccessible, except at one or the other of their ends, and occasionally it becomes needful to release the same and to reconnect speedily.

The special object of the invention is to provide an inelastic connector capable of resisting all strains, torsional, tensile or compressive, up to the ultimate limit of strength of the material used in its structure.

A further feature is in the provision of a type of lock coupling, not materially larger—in diameter—than that of the connected parts, nor of excessive length, it being compact, light in weight, and capable of application to a rod or tube, either at an end or at any point along its length.

Another purpose is to produce a device for expeditiously engaging and disengaging the ends of such elements, entirely by manual operation, no tools or special appliances being required.

These beneficial objects are accomplished by the novel and practical construction, combination and arrangement of mechanical elements, characterizing the invention, as hereinafter described and illustrated in the accompanying drawing, constituting a part of this disclosure, and in which:

Figure 1 is a side view of an embodiment of the invention, shown in a closed condition and indicating its application.

Figure 2 is a longitudinal sectional view taken on line 2—2 of Figure 1, and drawn to an enlarged scale.

Figure 3 is a detail perspective view of the connecting elements separately and in position for engagement.

Figure 4 is a transverse sectional view taken on line 4—4 of Figure 2.

Figure 5 is a similar sectional view taken on line 5—5 of Figure 2.

Referring in detail to the drawing, the element to be connected is shown as a tube having spaced apart ends 15R and 15L, such as would occur by cutting the tube and removing a short length to receive the coupling.

Fixed in the end 15L is the outer end of a

cylindrical plug 16, held securely, as by silver solder 17 or other preferred means.

The entering end portion of the plug has a bore 18 in which a rod may be held in a similar manner alternatively with tube.

An annular groove 19 formed in the tube is receptive of a split spring ring 20, acting as a stop for the tube; the continuing portion of the plug 16, extending beyond the ring, is equally reduced, on opposite sides, to produce a central, flat vinculum 21, having parallel sides and of a width corresponding to the diameter of the plug, and which terminates in a nib 22, constituting a generally cylindrical head, its axis at a right angle to that of the plug and its ends extending outwardly so that its length is considerably greater than the diameter of the plug.

Slidably engaged on the plug 16 is a sleeve 23, having a shoulder 24 and a diametrically reduced portion 25 therebeyond, provided with a gradually increasing taper to an enlarged terminal flange 26.

Formed lengthwise in the main, forward portion of the sleeve 23 is a narrow recess 27, leading to one of a pair of diametrically opposed openings 28 in the sleeve, near its front end, and leading therefrom, to one side, are bayonet slots 29.

A split spring band 30 is mounted slidably on the tapered portion 25 of the sleeve, limited in movement between the shoulder 24 and flange 26, and normally urged forwardly, due to its inclined seat 25.

Integral with the band 30 is spring strip 31, fitting the recess 27 and having its front end downwardly bent, constituting a spring detent 32; in order to facilitate moving the detent into and out of operative position, the band 30 is provided with an elongated finger receiving slot 33.

The mating plug 35 contains a similar bore 36 and is enterable into the tube end 15R, where it may be soldered or otherwise secured. A collar 37 on the plug limits its entrance into the tube.

The front, inner stem end 38 of the plug contains a central transverse bored socket 39 adapted to receive the nib 22, while leading from the bore, to the extreme end of the plug, is a slot or bifurcation 40 receptive of the vinculum 21.

In operation, the nib 22 is entered into the bore 39, while the vinculum 21 enters the slot 40 by relative lateral movement; the sleeve 23 is then moved to enclose these elements, the band 30 and detent being drawn rearwardly, a slight turn is then given the sleeve 23, relative to the plugs, causing the ends of the nib 22 to pass into

the bayonet slots 29, whereupon the detent 32, being moved forward, acts to prevent release of the nib, locking the two main parts of the coupling together.

Obviously, by sliding the band 30 rearward on the sleeve, the detent is withdrawn, allowing the sleeve 23 to be partially rotated, freeing the nib and permitting separation by lateral movement.

As such lateral movement need not exceed the length of the nib, no excessive bending of the connected tube, or rod, ends need be made.

It will be understood that the specific shape of the nib 22 is immaterial, the essential feature being that it constitutes an enlarged, elongated head, transverse to the axis of the coupling, the mating element being fitted thereto; it will also be apparent that tubes, rods and like elements, of various cross sections are readily connectible by the device.

Therefore, as changes of construction could be made within the scope of the invention, it is intended that all matter contained in the foregoing description, or shown in the accompanying drawing, shall be interpreted as illustrative, and not in a limitative sense.

Having thus described the invention, what is claimed as new and desired to secure by Letters Patent, is:

1. A shackle coupling having laterally intersecting ends capable of one being completely passed through the other, and releasable means to normally retain the ends in engagement, said means including an elongated nib on one of the coupling elements, a sleeve movable on the other element having openings to engage the ends of said nib, and resilient means to retain said sleeve when said nib ends are engaged in the sleeve openings, said coupling adapted to be manually controlled and to resist torsional and tensional strains.

2. A shackle coupling comprising, in combination with two elements fixedly united with the parts to be coupled, and cylindrical projections on the adjacent ends of said elements, one of said projections having a transverse opening therethrough and a slot extending from the opening to the end of the element, a cross bar connected with the end of the other of said elements and engageable in the opening, a sleeve movable on the other of said elements, bayonet slots in said sleeve to engage the ends of said bar, and releasable means to confine said ends when engaged in the slot.

3. A shackle coupling comprising a pair of plugs each fixed at their outer portions to the adjacent ends of elements to be coupled, one of said plugs having a transverse socket in its inner portion and a narrow passage leading therefrom through the plug end, an elongated nib and head fitted to said socket, a connection between said head and inner portion of the other of said plugs, said connection being fitted to the passage, a sleeve slidable on the head carrying plug, means in said sleeve to engage the ends of said head, and manually adjustable means to retain said head in said sleeve engaging means.

4. A shackle coupling comprising a pair of cy-

lindrical plugs adapted for fixed engagement with elements to be connected and disconnected, means at the outer portions of said plugs to locate said elements therewith, a central socket formed diametrically through the inner portion of one of said plugs and a parallel walled passage leading from the socket to the end of the plug, a vinculum on the mating plug suited to engage in said passage, an elongated transverse nib connected by said vinculum to engage in said socket, its ends extending outwardly, a sleeve slidable and rotatable on said plug to extend over nib and socket joint, bayonet joint slots in said sleeve in which to engage the extending ends of said head, and means to lock said ends therein.

5. A shackle coupling for uniting two linear elements longitudinally, comprising a plug fixed to one element, a collar on said plug and an extension therebeyond, a cylindrical socket formed diametrically through the extension, said socket having a parallel walled passage leading through the end of the plug, a mating plug fixed to the other element, a flattened central extension on the unattached portion of said mating plug, a transverse cylindrical nib on said central extension, said central extension and nib respectively fitting said passage and socket, a sleeve slidable on said mating plug to extend over the joint thus formed, said sleeve having opposed bayonet slots receptive of the end portions of said nib and having a longitudinal slot therein, means to limit the sliding movement of said sleeve, a spring band limitedly slidable on said sleeve and having a strip movable in said slot, and a detent on the free end of said strip adapted to retain the ends of said nib when in a forward position.

6. A coupling for uniting linear elements comprising two plugs each fixed in its respective element, one of said plugs having in its extending portion a slot terminating in an interior enlargement, an extension on the other of said plugs enterable in the slot and its enlargement laterally from either side, and means to maintain said plugs in engagement when in axial alignment.

7. A coupling for uniting linear elements lengthwise, comprising a plug having a bifurcation terminating in a bore exceeding in diameter the width of the bifurcation, a second plug having a stem engageable in the bifurcation of the first plug, a nib on the end of said stem enterable in the bore of the first plug, at least one end of said nib extending therebeyond, a sleeve rotatably and slidably adjustable on the first plug and having bayonet slots to engage the extending end of said nib, and a spring detent to retain said sleeve when in adjusted position.

8. A coupling for uniting linear elements, comprising a plug having a flattened portion, and an elongated nib at the end thereof, a socket having a slot completely therethrough adapted to receive such flattened portion and nib, a sleeve slidable on said plug to form a rigid connection between said plug and socket, and a spring detent adjustably carried by said sleeve to retain the plug and socket when in engagement.

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