June 11, 1963 C. F. FEDERICO 3,093,223

FLANGE SEAL

Filed July 6, 1961 2 Sheets-Sheet 1

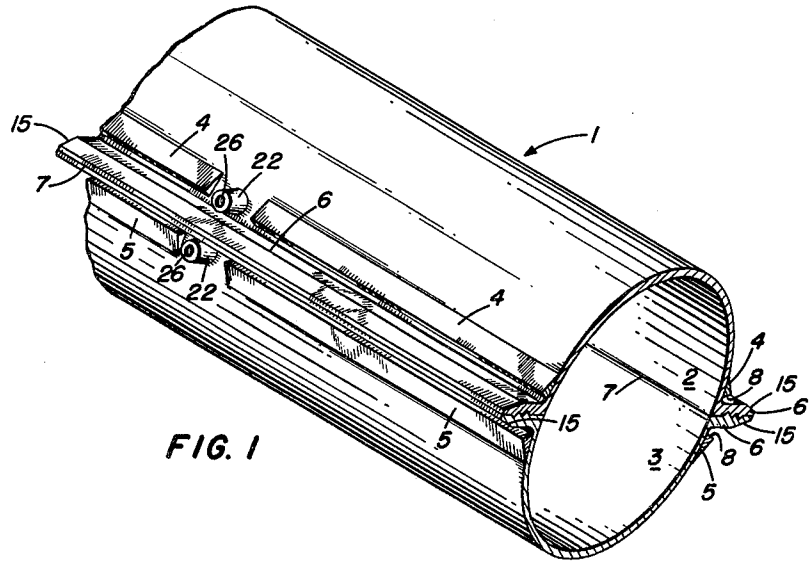


FIG. 1

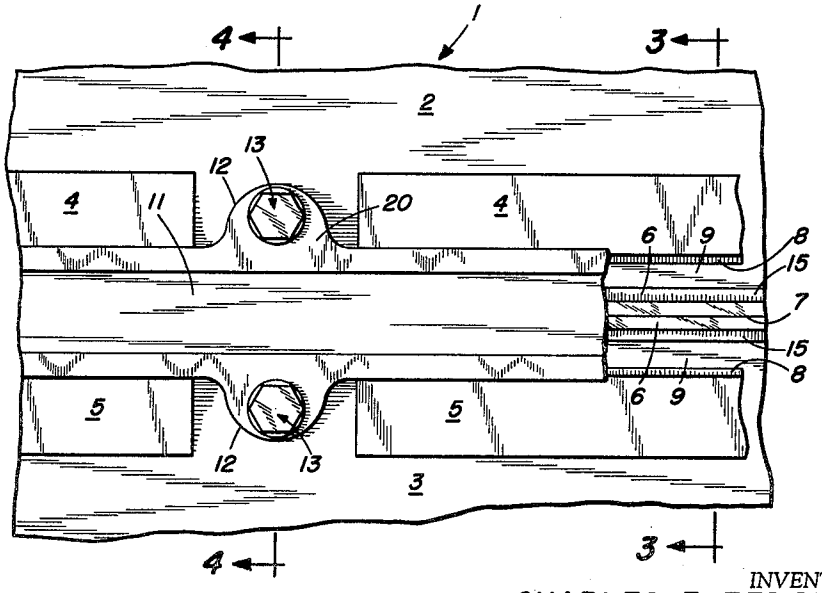


FIG. 2

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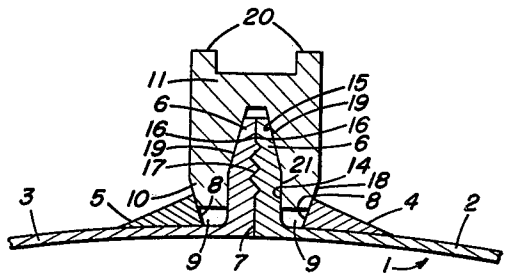


FIG. 3

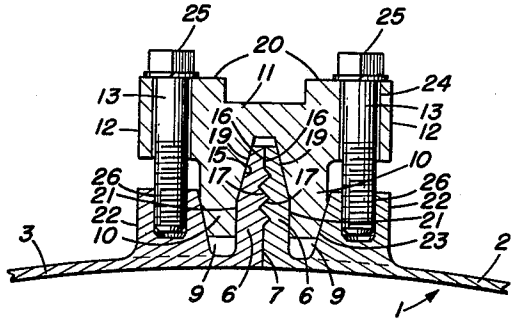


FIG. 4

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United States Patent Office 3,093,223 Patented June 11, 1963

3,093,223

FLANGE SEAL

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Filed July 6, 1961, Ser. No. 122,363
3 Claims. (Cl. 189—36)

The present invention relates to longitudinal flange type joints and more particularly to longitudinal flange type joints having a pair of abutting half-casings.

In the field of longitudinal flange joints, it has been the general practice to provide a pair of abutting flat faced flanges with a plurality of holes bored therethrough. Bolts were inserted through these holes and secured with nuts to hold the upper and lower halves of the casing together. It can readily be seen that such an arrangement would be very time consuming when it became necessary to open the casing for any reason whether it be for inspection, maintenance, or replacement purposes. Another disadvantage of prior art joints was the tendency of leakage to occur when the internal portion of the casing was subjected to high pressures. As can be expected, the leakage most frequently occurred along the seam of the joint where the upper and lower portions of the casing were fastened together.

The general purpose of this invention is to provide an improved longitudinal flange joint which provides a better seal between said flanges, is capable of being more readily released and possesses none of the aforedescribed disadvantages of the prior art. To attain this, the present invention contemplates a unique flange and track arrangement which cooperate with a rigid belt whereby the above recited improvements are obtained.

It is to be kept in mind that the instant invention has application in a variety of environments. The inventive concept of the present invention resides in the provision of a plurality of sections that are subject to internal pressure and it is desired to clamp said sections together and also provide a sealing means therebetween.

An object of the present invention is the provision of a flange joint which is easy to manufacture and requires less parts than previously used devices.

Another object of the present invention is to provide a joint that makes possible a reduction in the size of the flanges.

A further object of the present invention is the provision of a device wherein the pressure point of the flange is more evenly distributed over a greater area of flange.

A still further object of the invention is to provide a joint which has an improved seal therebetween and the pressure point of the flanges is brought closer to the casing wall.

Other objects and many of the attendant advantages of this invention will be readily appreciated as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings wherein:

FIG. 1 shows a preferred perspective view of a typical assembly employing the instant invention with the rigid belt removed to more clearly illustrate the tracks and flanges of said joint.

FIG. 2 illustrates an enlarged elevation view of the apparatus shown in FIG. 1 with the rigid belt in its secured position.

FIG. 3 shows a section of the device taken on the line 3—3 of FIG. 2, looking in the direction of the arrows.

FIG. 4 shows a section of the device taken on line 4—4 of FIG. 2, looking in the direction of the arrows.

Referring now to the drawings, wherein like reference characters designate like or corresponding parts throughout the several views, there is shown in FIG. 1, which

illustrates a preferred embodiment, a cylindrical member 1 having an upper section 2 and a lower section 3. In this view the rigid securing belt 11 is removed so as to permit a better view of the flanges 6 and their associated tracks 4 and 5.

Upper section 2 is provided with a plurality of longitudinally spaced wedge shaped tracks 4. Lower section 3 is also provided with similar wedge shaped tracks 5. Upper and lower sections 2 and 3, respectively, are also provided with flanges 6 that extend the full length of the longitudinal joint 7.

The wedge shaped tracks 4 and 5 are not a continuous track, but merely a plurality of tracks which are equally spaced along the length of the longitudinal joint 7. Tracks 4 and 5 are fixedly secured to the upper and lower sections, 2 and 3, respectively, by welding, brazing or any other suitable means of attachment. In positioning tracks 4 and 5 care must be taken to insure that the upper tracks 4 and lower tracks 5 are in proper alignment with each other.

Wedge shaped tracks 4 and 5 are spaced a predetermined distance from flanges 6 so as to provide a channel therebetween, said channels being indicated by numeral 9 in FIGS. 2, 3 and 4.

FIG. 2, is an enlarged plan view of the apparatus with rigid belt 11 in mating contact with abutting flanges 6. As can readily be seen, rigid belt 11 is provided with a plurality of tabs or ears 12. Ears 12 are spaced at various points along the length of belt 11 and receive bolts 13 for fixedly securing belt 11 in position over mating flanges 6.

FIG. 3, which is a sectional view taken along lines 3—3 of FIG. 2, clearly shows the manner in which belt 11 is received in channels 9 engaging tracks 4, 5 and flanges 6 to securely fasten the upper and lower sections, 2 and 3, respectively, together. It is to be noted that although only one longitudinal joint is discussed, there is, in fact an identical joint located 180° from the longitudinal joint 7, as shown in FIG. 1. It is merely for purposes of simplicity and an attempt to eliminate repetition that only one such longitudinal point 7 is discussed.

As shown in FIG. 3, each section, 2 and 3, is provided with a plurality of longitudinally spaced wedge shaped tracks 4 and 5, respectively. In addition, each section 2 and 3, is provided with a flange 6. Flanges 6 are provided with a straight portion 14 that is spaced opposite the inward face 8 of the wedge tracks 4 and 5. The outer end 15 of flange 6 has a tapered portion 19 at an angle which is opposite to the taper on the inward face 8 of wedge shaped tracks 4 and 5.

It is to be noted that the flanges 6 extend the full length of longitudinal joint 7. The mating faces 16 of flanges 6 are serrated at 17 to provide a better seal by presenting a more tortuous path for escaping gases. Serrated portion 17 in sections 2 and 3 will also be of assistance when positioning rigid belt 11 over the mated flanges 6. In this regard, serrations 17 will serve to align and stabilize sections 2 and 3 relative to each other.

Rigid belt 11, in cross-section, consists of a substantially U-shaped member having a pair of legs 10. Legs 10 are tapered at 18 and 19 to conform to tapered portions 8 and 15 of tracks 4, 5 and flanges 6, respectively. In addition, legs 10 of rigid belt 11 are also provided with flat portions 21 that are aligned with straight portion 14 of flanges 6 and mates therewith.

FIG. 4, which is a sectional view taken along lines 4—4 of FIG. 2, clearly shows the construction of rigid belt 11 as it appears when bolts 13 are inserted through ears 12 to fasten belt 11 to upper and lower sections, 2 and 3, respectively.

As shown in FIG. 4, sections 2 and 3 are provided with bosses 22 that are cast integral with the respective

sections. It is also possible to have bosses **22** welded in position on the casting, as an alternative means of attachment. Bosses **22** are located intermediate adjacent sections of tracks **4** and **5** and are provided with tapped bores **26** to receive bolts **13**. In these areas, where bosses **22** are located, the inner face **23** of bosses **22** are provided with an inwardly directed taper which has the same slope as the taper on inward face **8** of wedge tracks **4** and **5**.

As an alternative construction, bores **24** in ears **12** may be countersunk so as to permit bolt heads **25** to be flush with belt top **20** thereby reducing the area required by the protruding bolt heads **25**.

In an effort to more clearly define the instant invention, it is thought that a review of the manner in which the invention operates would be helpful, such as the following:

Upper section **2** is placed in position over lower section **3** so as to permit the flanges **6** of the respective sections to mate with each other. As pointed out above, serrations **17** will assist in aligning the sections **2** and **3** prior to placing rigid belt **11** in position. When sections **2** and **3** are properly aligned, rigid belt **11** is placed over flanges **6** and bolts **13** are inserted through bores **24** in ears **12** into threaded bores **26** of bosses **22**.

Taking up on bolts **13** exerts an inward force on the belt **11** and draws it inwardly toward channels **9**. As the belt **11** continues to move inwardly, taper portion **18** of belt **11** engages the taper on inward face **8** of wedge tracks **4**, **5** and also the taper portion of inner face **23** on bosses **22** when belt **11** comes into contact with a boss **22**. The flat portion **21** of belt **11** engages straight portion **14** of flanges **6**, also, tapered portion **19** of belt **11** engages the tapered portion **15** of flange **6**. As the bolts **13** are further tightened and rigid belt **11** continues to move inwardly the double wedging action produces a clamping and sealing action that is more effective than heretofore attained.

It is to be noted that the present invention possesses many ancillary features a few of which are: elimination of approximately 80 percent of the bolts previously required on a joint of equal length. In addition, the present invention possesses the unique feature of being a quick-release joint thus saving a considerable amount of time and money that is normally expended when inspecting, replacing or repairing the contents of the sections.

Obviously many modifications and variations of the present invention are possible in the light of the above teachings. It is therefore to be understood that within the scope of the appended claims, the invention may be practiced otherwise than as specifically described.

What is claimed is:

1. A connector for securing two sections together in assembled relation, the improvement comprising an upper and lower section, flange means for fastening said sections together, said flange means formed by a pair of flanges that are integral with each of said sections, said flanges being located at opposite ends of each of said sections, said flanges each having a mating face and an outer face, said outer face having a straight portion and a tapered portion, sealing means carried by said flange means, wedging means spaced from said flange means and attached to each of said sections, clamping means received by said flange means and said wedging means, said clamping means comprising a rigid belt of substantially U-shaped configuration, said rigid belt being received in said spaces, said rigid belt having ears for receiving bolts therethrough, said bolts threadably received by a plurality of spaced bosses, said bosses being located intermediate said wedge means and fixedly secured to said sections, said rigid belt having tapered portions that conform to and mate with said tapered portion on said outer face of said flanges and said tapered portion of said wedge means thus exerting a double wedging action on said flanges when said bolts are tightened urging said rigid belt inwardly causing said flanges to closely inter-engage and form a seal therebetween, additional means for securing said clamping means to said sections whereby said sections are securely fastened together and said sealing means seals said flange means.

2. A connector as described in claim 1 wherein said wedging means is formed by a wide track that is spaced a predetermined distance from said flange means, said wide track having an inwardly sloping taper and extending parallel to said flange means, said wedge track cooperating with said flange means to form a channel therebetween.

3. A connector as described in claim 1 wherein said clamping means comprises a rigid belt of substantially U-shaped configuration, said rigid belt being received in said spaces, said rigid belt having tapered portions that conform to and mate with said flange means and said wedge track whereby a double wedging action is exerted on said flange means presenting a close fitting flange means and also forming a seal therebetween.

References Cited in the file of this patent

UNITED STATES PATENTS

167,179	Leidy	Aug. 31, 1875
1,535,162	Kime	Apr. 28, 1925
2,772,853	Woodworth	Dec. 4, 1956

FOREIGN PATENTS

409,233	Italy	Feb. 9, 1945