July 6, 1965 J. R. YANCEY 3,192,592

HANGER LATCH

Original Filed Dec. 10, 1959

FIG_1

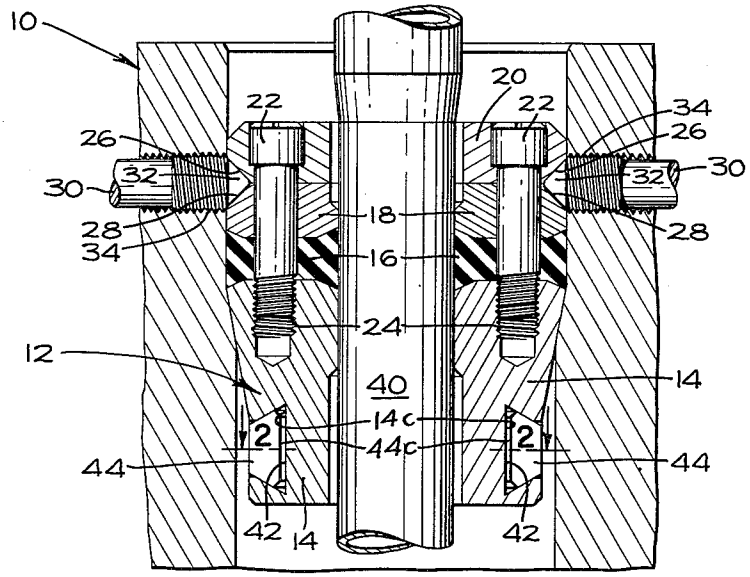


FIG_2

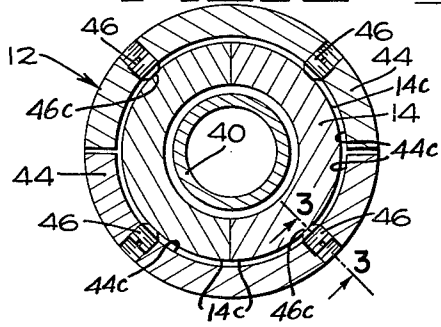


FIG_3

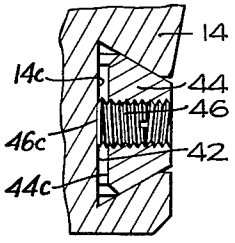


FIG_4

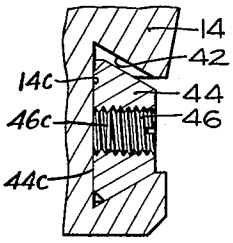


FIG_5

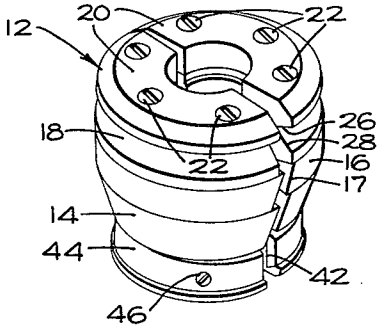
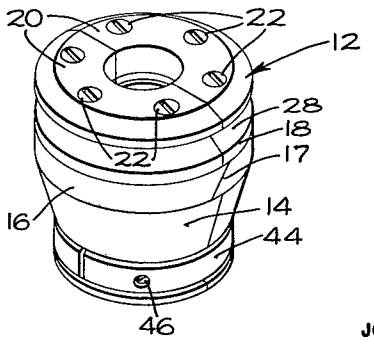


FIG_6



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HANGER LATCH

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Continuation of application Ser. No. 858,702, Dec. 10, 1959. This application May 27, 1964, Ser. No. 370,404
13 Claims. (Cl. 24—263)

The present application is a continuation of my application Serial Number 858,702 filed December 10, 1959, entitled Hanger Latch and now abandoned.

This invention pertains to split hangers for suspending one or more strings of tubing or casing within a well installation, and particularly to latches for hangers of this type.

An object of the invention is to provide an improved latch mechanism for locking a split hanger in assembled relation about a string of tubing or casing.

Other objects and advantages of the invention will become apparent from the following description and accompanying drawings, in which:

FIG. 1 is a vertical diametric sectional view of a hanger embodying the latch of the present invention, showing the hanger installed in a well head assembly.

FIG. 2 is a horizontal section taken on lines 2—2 of FIG. 1.

FIG. 3 is a section taken on line 3—3 of FIG. 2 and illustrates the latch in its locked position.

FIG. 4 is a view similar to FIG. 3 and illustrates the latch in its released position.

FIG. 5 is a perspective of the hanger with the latch of the present invention released and the hanger partly open.

FIG. 6 is a perspective of the hanger showing the latch in its latched relation thereto.

Referring now particularly to FIG. 1, 10 indicates a tubing or casing head of conventional construction mounted at a well head in the usual manner. A hanger 12 is mounted therein and comprises a lower metal portion 14, a packing element 16, a packing energizing ring 18 and an upper ring 20. A plurality of cap screws 22 extend through suitable apertures in the rings 18 and 20 and the packing element 16, and are threadedly received in suitably tapped holes 24 in the lower member 14 to hold the several elements in their assembled relation.

The rim of the ring 20 is chamfered downwardly and inwardly as indicated at 26, and the rim of the ring 18 is chamfered upwardly and inwardly as indicated at 28. A plurality of retaining pins 30 having conical inner ends 32 extend through and are threadedly engaged in suitably tapped horizontal holes 34 in the tubing head 10, and are adapted to be screwed inward to engage the chamfered surface 28 and force the ring 18 downwardly to energize the packing element 16 in the manner which is customary and well known in the art.

Referring now to FIG. 5, it will be seen that the several rings 14, 18 and 20 are split diametrically into arcuate segmental members and that the sealing element 16 is provided with a radial split 17 in alignment with the end portions of the segments of the rings 14, 18 and 20. Thus, the sealing element 16 acts as a hinge for the hanger 12 as it is opened as illustrated in FIG. 5 to fit it around a well string 40, as illustrated in FIG. 1.

The latch of the present invention comprises an annular groove 42 of dovetail cross section, formed in the periphery of the lower element 14 of the hanger 12. A ring 44, likewise having a dovetail cross sectional configuration, is slidably received within the groove 42. The ring 44 is split diametrically into arcuate segmental members as is the element 14 within which it is mounted. A plurality of setscrews 46 are threaded into suitably tapped

radial holes in the ring 44 and are adapted to abut against the bottom surface of the groove 42 formed in the element 14.

In the use of the latch assembly of the present invention the setscrews 46 are withdrawn, as illustrated in FIG. 4, to permit the two halves of the latch ring 44 to be rotated in the groove 42 until the ends thereof are in alignment with the diametrical split in the element 14. The hanger 12 can now be opened, as illustrated in FIG. 5, and installed about a well string 40, as illustrated in FIG. 1. When the hanger 12 has been so installed, the two halves of the ring 44 are again rotated in the groove 42 until the ends thereof are approximately 90° removed from the diametrical split in the element 14. While in this position the two halves of the ring 44 interconnect the two halves of the hanger 12, uniting them into a substantially cylindrical body through which the well string 40 extends. The setscrews 46 are then turned inwardly to force the ring 44 outwardly into tight engagement with the inclined walls of the dovetail groove 42 as illustrated in FIG. 3, thus locking the ring 44 against circumferential shifting within the groove 42. The assembly is then ready for the string 40 to be lowered to land the same within the casing head by means of the hanger 12.

When it is desired to remove the hanger 12 from the well string 40, the setscrews 46 are again withdrawn to loosen the ring 44 in the groove 42, and the ring is again turned until the ends of the halves thereof are in alignment with the diametrical split in the element 14. The hanger 12 may now be again opened, as illustrated in FIG. 5, and removed from the well string 40. The rings 14 and 44 thus provide a plurality of arcuate segmental first and second members disposable together in cooperating relation with respect to each other to form a substantially radially rigid annular body, these first and second members and the setscrews 46 which are effectively part of the second members having axially extending first and second holding means 14*c*, 44*c* and 46*c* which, as best illustrated in FIGURES 2, 3 and 4, engage one another upon relative arcuate movement of the members about their common axis between the first or open position of FIGURE 5 and the second or closed position of FIGURE 6.

While a particular embodiment of the present invention has been shown and described herein, it should be noted that various changes may be made therein without departing from the spirit of the invention as defined in the appended claims.

Having thus disclosed my invention, what is claimed and desired to be protected by Letters Patent is:

1. A hanger for suspending pipe within a well comprising a diametrically split cylindrical body having an annular groove in the periphery thereof, a latch mechanism comprising a diametrically split ring mounted in said groove for circumferential movement relative to said body, said ring and said groove having complementary cross sectional configurations whereby said ring is restrained from movement radially out of said groove, and releasable means forcing said ring against a side wall of said groove to positively align the parts of said body.

2. A hanger for suspending pipe within a well comprising a cylindrical body split into a plurality of sections of arcuate cross section and having an annular groove formed in the periphery of said body, a ring slidably mounted in said groove and split into a plurality of arcuate sections, said ring and said groove having complementary cross sectional configurations whereby the sections of said ring are restrained from moving radially out of the groove, and a setscrew threaded into a hole extending radially through the ring and adapted to abut one wall of said groove to move the ring into tight engagement with another wall of said groove and lock the

ring against circumferential movement relative to said body and rigidly interconnect said body sections.

3. A hanger for suspending pipe within a well comprising a cylindrical body split into a plurality of sections of arcuate cross section and having an annular groove of dovetail cross sectional configuration formed in the body, and a ring of dovetail cross section split into a number of arcuate sections corresponding both in arcuate length and in number to the body sections, said ring being slidably mounted in said groove for movement circumferentially of the body to optionally interconnect the sections of the body or to release them from each other, and means engageable with said ring for pressing said ring into pressure engagement with a side wall of said groove for rigidly uniting said body sections in cylindrical arrangement.

4. A hanger for suspending pipe within a well comprising a diametrically split cylindrical body having an annular groove in the periphery thereof, said groove having a dovetail cross sectional configuration, a diametrically split ring of dovetail cross section slidably mounted in said groove, said ring being adapted to bridge the split in said body, and a plurality of setscrews screwed into threaded holes extending through the ring and adapted to abut the bottom of the groove to move the ring against a side wall of said groove to align the parts of the split body in the shape of a cylinder and to lock the ring against circumferential movement relative to said body.

5. A hanger for suspending pipe within a well comprising a cylindrical body split into a plurality of arcuate segments and having an annular groove formed therein, a latch mechanism comprising a ring split into a number of sections equal to the segments of said body both in number and in arcuate length and mounted in said groove for circumferential movement relative to said body, said ring and said groove having complementary cross sectional configurations whereby said ring is restrained from movement out of said groove, and a threaded member engaging each of said sections for advancing the same into tight engagement with a side wall of said retaining groove.

6. A hanger for suspending pipe within a well comprising a cylindrical body split into a plurality of arcuate segments and having therein inclined walls defining an annular groove of dovetail cross sectional configuration, and a ring having inclined walls providing a dovetail cross sectional configuration, said ring being split into a number of arcuate sections corresponding to the number of the body segments, said ring being slidably mounted in said groove for movement circumferentially of the body to optionally interconnect the sections of the body or to release them from each other and means on said ring for moving said inclined ring walls into engagement with said inclined groove walls.

7. A hanger for suspending pipe within a well comprising a diametrically split cylindrical body having therein an annular groove having at least one inclined wall, a diametrically split ring having a correspondingly inclined wall, said ring being slidably mounted in said groove for movement circumferentially with respect to the body, and releasable means for forcing said inclined wall of the ring against said inclined wall of the groove to align and firmly interconnect the parts of said split body in fixed position relative to each other.

8. A hanger assembly for supporting a pipe string from the interior seat of a well head comprising a plurality of arcuate segmental first and second members disposable together in cooperating relation with respect to each other to form a substantially radially rigid annular body having an exterior seat for engaging the interior seat of a head, there being a bore for receiving a pipe string, and means for supporting a pipe string received in said bore, said members in cooperating relation being arcuate about a common axis, said first and second members having axially extending first and second holding means, respectively, adapted to engage one another upon relative arcuate movement about said common axis between a first position of cooperating relation wherein said members are movable out of and into surrounding relation to a pipe string between the ends thereof and a second position of cooperating relation wherein said members are fixedly retained by said holding means in cooperating relation to form said substantially radially rigid annular body.

9. A split hanger comprising a plurality of first arcuate segmental members, each of said first members having opposite end edges, said members being assembled in annular formation with adjacent end edges of the members in confronting relation to each other, said confronting end edges defining splits between said first members, each of said first members, having a groove extending between said end edges with said grooves forming a continuous annular slot in the assembled formation of said members, and a plurality of second arcuate segmental members fitted in said slot and being freely slidable about the entire circumference of said slot, said second members individually bridging said splits so that all of said splits are bridged, said second members having opposite end portion means extending partially into the grooves of the first members and releasably holding said assembled first members in radially rigid relation.

10. The hanger of claim 9 wherein each groove has a predetermined length, wherein each second member has a length substantially equal to said predetermined length, and wherein said second members are movable in said slot individually into the grooves of said first members so that each first member can carry a second member and so that each of said first members can be separated from the other of said first members when said second members are individually entirely located in their respective grooves.

11. The hanger of claim 9 wherein said end portion means of the second members have opposite ends in confronting relation to each other and define secondary splits therebetween, and wherein said secondary splits are approximately midway between the splits defined by said first members.

12. The hanger of claim 9 wherein there are two semi-cylindrical first members and two semi-cylindrical second members.

13. The hanger of claim 9 wherein said first and second members have interengaging surfaces limiting movement of said second members transversely thereof out of said slot without interfering with the free circumferential movement of the second members in the slot.

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