

April 2, 1963

C. C. BROWN
SAFETY JOINT DEVICE

3,083,767

Filed June 23, 1958

3 Sheets-Sheet 1

Fig. 6

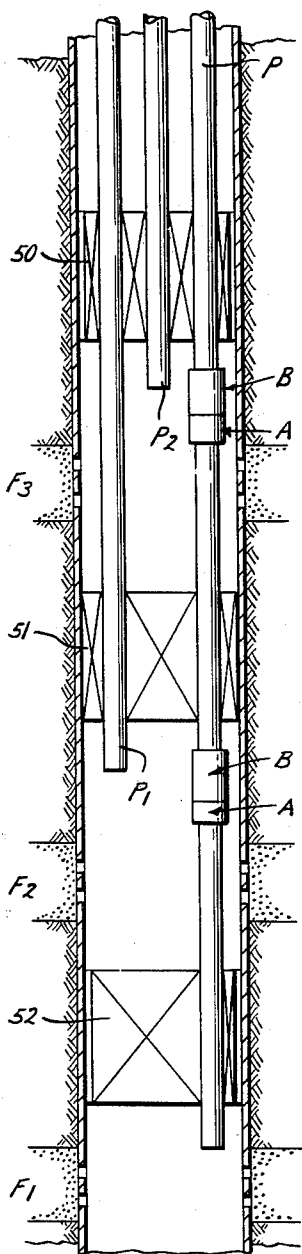


Fig. 7

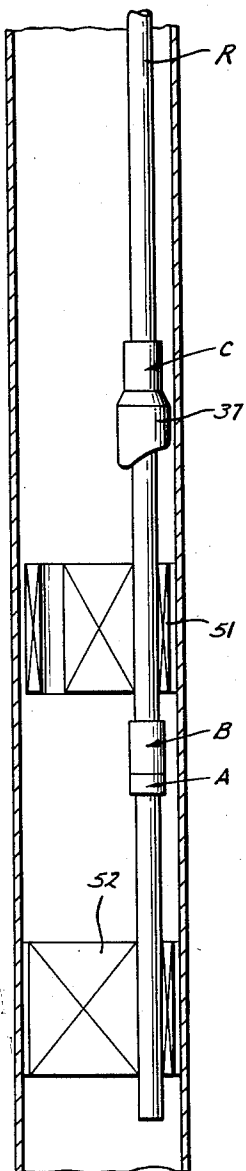
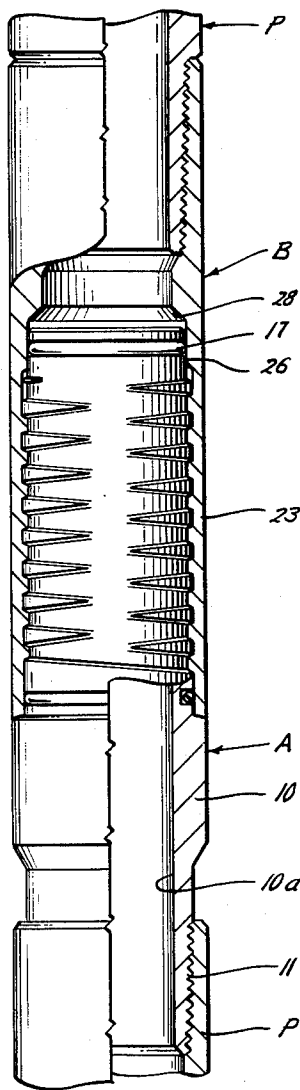


Fig. 1



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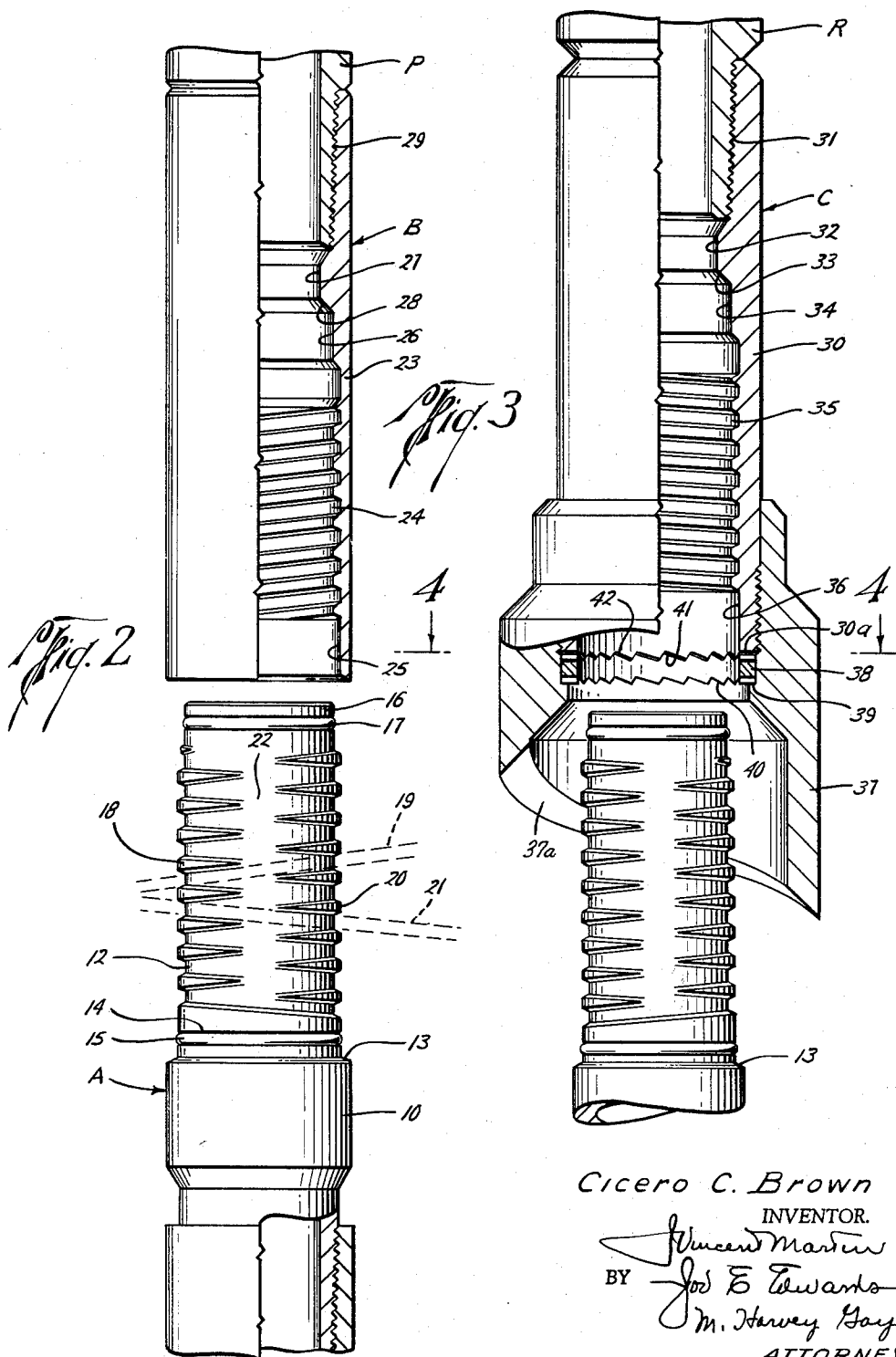
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Fig. 4

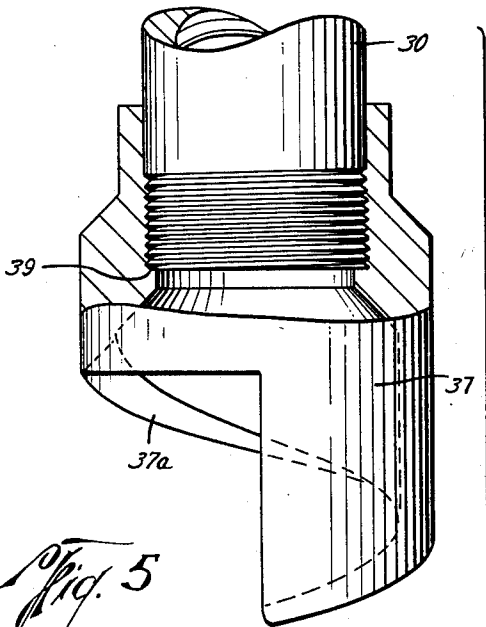
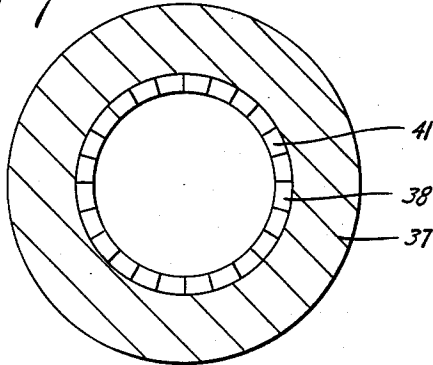


Fig. 5

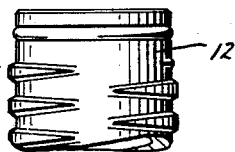
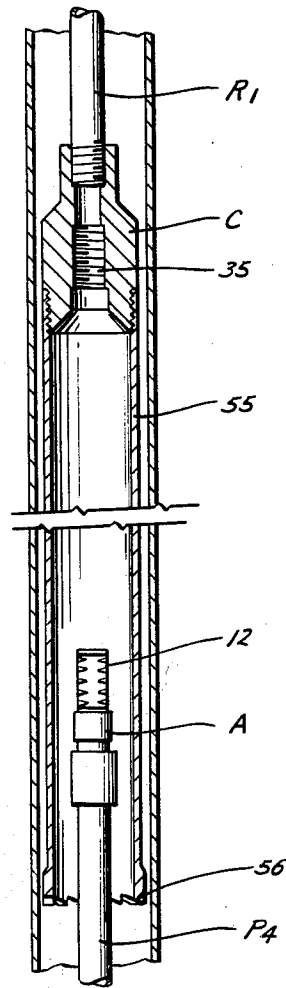


Fig. 8



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3,083,767

SAFETY JOINT DEVICE

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15 Claims. (Cl. 166-46)

This invention relates to new and useful improvements in safety joint devices.

In the usual type of safety joint now in general use in the oil industry, said joint normally includes two complementary sections which are connected together by a left-hand threaded connection. The joint is disposed in the pipe string and if conditions occur which require disconnection at the safety joint, the upper portion of the pipe string is rotated to the right; due to the left-hand threads which connect the sections of the safety joint, such rotation of the pipe string disconnects or separates the safety joint sections and permits removal from the well bore of that portion of the pipe string, and any equipment carried thereby, which is above said safety joint. The lower section of the safety joint and the portion of the pipe string therebelow remain in the well bore.

Since the lower section of the safety joint which remains in the well bore is formed with left-hand threads, it is substantially impossible to reconnect with said threads because such reconnection would require a rotation of an upper string in a direction to the left; since all other joints or connecting collars in the pipe string include right-hand threads, it is evident that rotation to the left in an attempt to reconnect with the left-hand threads of the safety joint section may result in inadvertently and unintentionally breaking out or disconnecting at one of the normal connecting joints or collars of the string. For this reason it has been necessary to employ some type of fishing tool for engagement with the safety joint section, and, since such fishing tools are ordinarily designed only for use in the removal of pipe and equipment from the well bore, all that can ordinarily be done after a safety joint has been disconnected is to remove the pipe and equipment remaining in the well bore by a fishing operation.

Many conditions arise where it is desirable to disconnect the sections of a safety joint, and then at some subsequent time make a firm reconnection with the lower section of said joint which has remained in position within the well bore. Also in certain instances, the reconnection should be such that the entire pipe string may be subsequently rotated or otherwise manipulated. The safety joints now in general use are not applicable for these purposes.

It is, therefore, one object of this invention to provide an improved safety joint device which will normally function in the usual manner to permit disconnection of its sections by a rotation of the pipe string in a direction to the right but which includes means allowing a firm reconnection to be made with the lower section of the joint also by a rotation of the pipe to be reconnected in a direction to the right, whereby danger of breaking out or disconnecting the usual right-hand threaded collars of said pipe during the reconnecting operation is obviated.

An important object is to provide an improved safety joint device having a lower section formed with both right-hand and left-hand threads, together with an upper section having only left-hand threads for connection with the left-hand threads of the lower sections, whereby the two sections form a safety joint which functions in the usual well known manner; the device also included a second upper section provided with right-hand threads only which are adapted to be engaged with the right-hand threads of the lower section after the first upper section

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has been removed, whereby a firm reconnection with said lower section may be made.

Another object is to provide an improved safety joint wherein the right and left-hand threads of the lower section extend throughout substantially the same area on said section with the same threads defining both the right and left-hand tracks or channels on said section, whereby construction is simplified and the overall length of the section held to a minimum.

A further object is to provide means in the upper section which makes the reconnection with the lower section of the device for limiting the tightness of the connection, so that the sections can be separated in the event subsequent disconnection is required.

Another object is to provide an improved safety joint device which is particularly adaptable for use in a pipe string on which a plurality of well packers are mounted, said device facilitating removal of said packers from the well bore.

Still another object is to provide a device of the character described which has all of the advantages of the usual safety joint but, in addition, has the advantage of permitting a positive reconnection at the joint, whereby the device is particularly useful in washover operations.

The construction designed to carry out the invention will be hereinafter described, together with other features thereof.

The invention will be more readily understood from a reading of the following specification and by reference to the accompanying drawings forming a part thereof, wherein an example of the invention is shown and wherein:

FIGURE 1 is a view partly in section and partly in elevation of the lower and first upper section of a safety joint device constructed in accordance with the invention and illustrating the sections in connected position,

FIGURE 2 is a similar view showing said first upper section disconnected from said lower section and being lifted upwardly,

FIGURE 3 is a similar view of the second or reconnecting upper section of the device being moved downwardly into position for reconnection with said lower section,

FIGURE 4 is a horizontal cross-sectional view taken on the line 4-4 of FIGURE 3,

FIGURE 5 is a slightly modified form of the upper reconnecting section shown in FIGURE 3,

FIGURES 6 and 7 are schematic diagrams illustrating the use of the device in combination with multiple packers, and

FIGURE 8 is a schematic sectional view showing the improved device combined with a washover pipe.

In the drawings, the letter A designates the lower section of the improved safety joint device constructed in accordance with the present invention. This section comprises a tubular body 10 having a depending threaded pin 11 at its lower end, whereby the section A may be connected in a pipe or tubing string which is generally indicated by the letter P. The body 10 is preferably formed with an axial bore 10A which extends entirely therethrough.

As is clearly shown in FIGURE 2, the section A has its upper portion reduced to form a generally cylindrical stem portion 12, and the difference in diameter between the stem portion and the body 10 provides an external annular shoulder 13 on the body. Immediately above the shoulder 13, the external surface of the stem portion has an annular groove 14 cut therein for reception of a suitable packing ring, such as an O-ring 15. The extreme upper end of the stem portion 12 is provided with a similar annular groove 16 for receiving a similar packing or sealing ring 17.

Extending substantially throughout the area of the stem portion 12 between the sealing rings are external threads 18 which are right-hand threads and which form right-hand thread tracks, as indicated by the dotted lines 19. Additional threads 20 are formed in the external surface of the stem portion, and these threads are left-hand threads to provide left-hand thread tracks, indicated by the dotted line 21 in FIGURE 2. As shown in the drawings, the threads 18 and 20 are the well-known relatively coarse safety joint-type of threads which will break out more easily than the finer connecting threads used in well pipe couplings. In forming both the right and left-hand threads on the stem portion, the right-hand threads 18 are first formed in the usual manner, being cut in the external surface of said portion to provide a substantially continuous spiral thread. After the right-hand threads have been formed, the external portion of the stem has the left-hand threads cut therein; during this thread-forming operation, a portion of the previously formed right-hand threads is removed along the area where the left-hand thread projections cross the right-hand thread projections, with the result that both sets of threads are interrupted along a longitudinal area of the stem, such area being indicated at 22. Actually two smooth areas 22 are present on the stem portion, with said areas being diametrically opposite each other. However, the interruptions of the thread projections are proportionately small with respect to the overall thread projections, and, for all practical purposes, the external right and left-hand threads on the stem portion 12 are continuous and will couple effectively to complementary elements.

For connecting with the left-hand threads 20 of the stem portion 12, an upper safety joint section B is provided, and this upper section (FIGURES 1 and 2) comprises a sleeve 23 having left-hand threads 24 in the wall of its bore. The threads 24 are also the usual relatively coarse safety joint-type of threads and preferably terminate short of the lower end of the sleeve 23 to provide a straight annular wall surface 25 at the extreme lower end of the bore of said sleeve. Above the threads 24, the bore of said sleeve has a straight wall surface 26, and above this surface the bore is reduced in diameter as indicated at 27 to form an internal annular shoulder 28. Above the reduced portion 27, the upper end of the sleeve 23 is provided with the usual threaded box 29, whereby the sleeve may be connected to the pipe string P.

The connection of the upper section B with the lower section A of the safety joint is illustrated in FIGURE 1, and such connection is made by engaging the left-hand threads 24 of the sleeve 23 with the left-hand threads 20 of the stem portion 12 of section A. When in fully connected position, the straight wall surface 25 within the lower end of the bore of sleeve 23 encompasses and seals with the packing ring 15 just above the external shoulder 13 on the body, which shoulder is engaged by the lower end of the sleeve when the parts are in fully connected position. In fully connected position, the internal shoulder 28 abuts the upper end of the stem portion, and the straight wall surface 26 with the bore of the sleeve seals with the upper packing ring 17 on said stem portion.

With the safety joint sections A and B connected together and disposed in a pipe or tubing string P, the string may be lowered within the well bore and handled in the usual manner. When the sections A and B are to be disconnected from each other, it is only necessary to impart a rotation to the pipe string P in a direction to the right, which uncouples the left-hand threads 24 of the sleeve 23 from the left-hand threads 20 of the stem portion 12. Such right-hand rotation of the pipe string will not affect any of the other couplings in said string, since said couplings include the usual right-hand threads, and a right-hand rotation which disconnects the safety joint sections will merely serve to tighten such other couplings.

After the section B has been disconnected from section A in the manner illustrated in FIGURE 2, section B

and that portion of the pipe string thereabove are completely separated from section A and the remainder of the pipe string.

In order to reconnect the previously removed portion of pipe string P or a different pipe string R with the safety joint section A, a third or reconnecting safety joint section C is provided, this section being illustrated in FIGURE 3. The section C includes a tubular body 30 having a threaded box 31 at its upper end for connection to the lower end of the pipe string R. Below the threaded box 31 the bore of the body 30 is reduced at 32 to form an internal shoulder 33 and below this shoulder is a straight annular surface 34. Internal relatively coarse safety joint-type right-hand threads 35 are formed within the bore of the body 30 and extend from a point spaced below the surface 34 to a point located above the lower end of said body. The extreme lower end of the bore of the body is formed with a straight annular surface 36.

The internal right-hand threads 35 of the section C are adapted to be engaged with the right-hand threads 18 which are formed on the stem portion 12 of the section A, and, in order to facilitate the engagement of the body 30 over the stem portion, an annular guide element or collar 37 may be threaded onto the lower end of the body 30. This guide element has a spiral or generally helical guide surface 37A on its lower periphery, whereby the body 30 will be guided over the upper end of the stem portion 12.

In order to prevent excessive tightening of the right-hand threads 35 on the right-hand threads of the stem portion 12, an anti-tightening ring 38 is interposed between a shoulder 39 within the bore of the guide element 37 and the lower end 30a of the body 30 of the section C. This ring is provided with serrations 40 on its lower peripheral edge and with similar serrations 41 on its upper peripheral edge. The lower end of body 30 is provided with complementary serrations 42 which interengage with the serrations or teeth 41 on the upper end of the ring; the ring is rotatable relative to the bore of the guide element and is also movable relative to the body 30 within the limits of the normal loose engagement of the serrations 41 and 42. However, since the serrations 41 and 42 are in constant but loose engagement with each other, the ring will be rotated with the body 30 and with the guide element. The serrations are so arranged that the ring 38 resists rotation in a right-hand direction when the lower serrations 40 of the ring are engaged with the external shoulder 13 of section A.

When the body 30 of the section C is engaged over the stem portion and its right-hand threads 35 engaged with the right-hand threads 18 on the stem portion 12, the lower serrated edge 40 of the ring 38 engages the shoulder 13. At this time the sealing ring 15 seals with the annular surface 36 within the body, while the upper seal ring 17 seals with the surface 34 of the body. At the time that the ring 38 engages the external shoulder 13 of section A, the upper end of the stem portion 12 is in abutting relationship with the internal shoulder 33 formed in the body of the section C. The sharp transverse edges of the serrations 40 contact or engage the shoulder 13 and tend to dig into the surface of the shoulder to resist a right-hand rotation; this resistance to rotation of the ring 38 causes a cam action to occur between the engaged serrations 41 and 42 and due to the disposition or angle of inclination of the serrations, resistance to further right hand rotation of the body 30 relative to the section A is produced. Therefore, excessive tightening of the threads 35 and 18 is prevented. With this arrangement the safety joint section C will not be connected to the safety joint section A with an excessive tightening action; with the result that when and if necessary, a reverse or left-hand rotation of the pipe R will cause the sections C and A to break out or disconnect before any of the other couplings in the pipe string will unscrew.

Although it has been found desirable to employ the ring 38, it is not absolutely essential that such ring be

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employed, and, in FIGURE 5, a modification of the invention is shown wherein the body 30 has its lower end abutting the internal shoulder 39 formed within the guide element 37. In this instance, the ring 38 is omitted and the section C has its right-hand threads 35 connected to the right-hand threads of the stem 12 in a normal manner. Where the ring 38 is not used, the operator is required to more accurately control the tightening action between sections A and C. In both instances, however, a reconnection with the lower section A of the safety joint device may be made.

The safety joint device herein disclosed has been found particularly useful in making the connection in a pipe or tubing string P upon which is mounted a plurality of well packers, and, in FIGURES 6 and 7, the operation of the safety joint in such use is illustrated. Referring to FIGURE 6, a pipe string P has a plurality of packers of any desired construction 50, 51 and 52 mounted thereon. The packers are adapted to be set within a well bore to separate production from formations F1, F2, and F3. In the particular installation which is schematically illustrated, the sections A and B of the safety joint device herein disclosed are connected in the pipe string between each of the packers. The production from the lowest formation F1 flows upwardly through the pipe string P, which carries all of the packers 50, 51 and 52. Production from the second formation F2 is conducted to the surface through a second pipe string P1 which extends through the uppermost packers 50 and 51, while production from the third formation F3 is through a third production string P2. The strings P1 and P2 are slidably sealed with the packers through which they extend.

When it is desired to remove the packers 50, 51 and 52, difficulty may be experienced in attempting to remove all three packers on the single string P. For example, if the packers have been in a set position for a period of time, said packers may remain in frictional contact with the casing wall even though their setting mechanism has been released; in such instance, a straight upward pull on the packers may not be sufficient to dislodge and remove all packers. The provision of a safety joint device of the present invention between said packers in the manner shown makes possible the easy removal of the packers independently of each other. The pipe string P is rotatable within the packers 50, 51 and 52, but the lower portion of said string will be held stationary because the lower packers remain in a more or less set position or at least in frictional contact with the bore. By rotating the upper portion of the pipe string P in a direction to the right, the uppermost safety joint device will break out, and its upper section B will be unscrewed from the lower section A. When this occurs, the pipe P together with the upper packer 50 may be raised upwardly and removed from the well bore. Since the pipes P1 and P2 are slidably engaged with the respective packers through which they extend, these pipes may be removed along with the upper portion of string P and packer 50 or they may be removed independently of and prior to removal of the string P and packer 50.

After the strings P1 and P2 and the upper packer 50 have been removed from the well bore, the two lower packers and the pipe string below the section A of the uppermost safety joint remain in the well. At this time, the upstanding stem portion 12 of the section A above the intermediate packer 51 is exposed within the well bore. A retrieving pipe string R is then provided with the reconnecting section C of the safety joint, such section being secured to the lower end thereof. Pipe R is then lowered downwardly within the bore and, by means of the guide element 37, is guided into contact with the upstanding stem portion A of the uppermost safety joint device. By rotation to the right, the threads 35 of the section C are connected with the right-hand threads of the stem 12 of section A in the manner explained and, after the connection is complete, an upstrain may be

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taken on pipe R. If the third packer 52 is sufficiently free, both packers 51 and 52 may be retrieved at the same time. However, if this is not possible, then a continued rotation to the right will break out the next-below safety joint, which is the joint illustrated below the packer 51 (FIGURE 7), resulting in a separation of the sections B and A of said lower safety joint. Thereafter, the pipe string R is utilized to retrieve the second packer 51.

Subsequently, the retrieving pipe R, together with the reconnecting section C, is again lowered into the well and is engaged with the upstanding stem portion 12 of the safety joint section A still remaining within the bore and located above the lowermost packer 52.

By reconnecting with the right-hand threads of the reconnecting section C to the section A, the lowermost packer is retrieved by means of the retrieving pipe R. It is thus evident that the provision of the reconnecting section C makes it possible to make a firm reconnection through the section A with that portion of the pipe below said section A.

Another use of the improved safety joint device is illustrated in FIGURE 8. In this figure, a section of a pipe string P4 is shown as remaining within the well bore. This pipe string has the safety joint section A secured to its upper end, said section having previously been connected through the safety joint section B to the remaining portion of the pipe. The sections A and B have been disconnected and that portion of the pipe above section A has been removed from the well, leaving only the pipe P4 below the safety joint section A (FIGURE 8). The pipe P4 may be assumed to be stuck in the well bore and a washing over operation to release the pipe is required to loosen said pipe. In such event, the safety joint reconnecting section C having the internal right-hand threads 35 is lowered within the well bore on the lower end of a retrieving pipe R1. Secured to and extending downwardly from the section C is a washover pipe 55 having a shoe 56 at its lower end. The washover pipe is connected to the threads on section C which ordinarily receive the guide element 37.

As the retrieving pipe R1 and section C, together with the washover pipe, are lowered, the retrieving pipe may be rotated and a washing operation may be carried out. As the washover pipe moves downwardly over the stuck pipe P4, the material around the exterior of said pipe is washed away and upon completion of the washing operation, the safety joint reconnecting section C has moved into position for engagement with the upstanding stem portion 12 of the safety joint section A. Continued right-hand rotation of the retrieving pipe R1 will result in a connection of the right-hand threads 35 of section C with the right-hand threads of the stem 12 of section A, and this will make a direct firm connection between the retrieving pipe R1 and the pipe P4. Thereafter, it is possible to exert an upward pull or to continue to rotate the pipe P4 to free said pipe and retrieve it from the well bore. The advantages of the use of the improved safety joint device in this manner are evident in that a separate run of the washover pipe followed by a subsequent run of a retrieving pipe is eliminated.

From the foregoing, it will be seen that the safety joint device includes three sections. The section A may be identified as a lower section and includes both right and left-hand threads which extend along substantially the same area of the upstanding stem. The upper section B, having left-hand threads, is normally connected with the left-hand threads of section A when the pipe is first lowered in the well bore and, when connected, the sections A and B function in the manner of a normal safety joint releasable by right hand rotation. By using the section C, which may be referred to as a "reconnecting section," it is only necessary to lower another pipe string and to firmly reconnect with the section A also by a right-hand rotation, which assures that such firm connection may be made. Although the threads on the stem portion are

illustrated as located externally, it is obvious that the right and left-hand threads could be formed within the bore of the section A and the threads on the sections B and C in such case would be on an external pin or stem. Obviously, the same results would be obtained with this reversal of the threaded sections.

The foregoing disclosure and description of the invention is illustrative and explanatory thereof and various changes in the size, shape and materials, as well as in the details of the illustrated construction, may be made within the scope of the appended claims without departing from the spirit of the invention.

What I claim is:

1. A safety joint device including, a first section having both right-hand and left-hand threads formed thereon, a second section having left-hand threads for connection with the left-hand threads of said first section, said sections being disconnected by a rotation of the second section in a direction to the right, a third section having right-hand threads formed thereon for connection with the right-hand threads of the first section after the second section has been disconnected and removed from said first section, and an annular non-flexible element mounted within said third section and engageable by the first section after the first and third sections are connected together and having means coacting with said first and third sections to limit the tightness to which the connection between the third section and the first section may be made up, whereby subsequent separation of the sections is facilitated.

2. A safety joint device including, a lower section having a generally cylindrical stem formed with external relatively coarse safety joint-type right-hand and left-hand threads which overlie each other and are disposed on the same area of said stem, an upper tubular section having internal relatively coarse safety joint-type left-hand threads formed therein and engageable with the left-hand threads on the stem of said lower section to form a connection between the lower and upper sections, and a reconnecting section comprising a tubular body having relatively coarse safety joint-type internal right-hand threads and engageable with the right-hand threads on the stem of the lower section when the upper section is disconnected and removed from the lower section.

3. A safety joint device including, a lower section having a generally cylindrical stem formed with external relatively coarse safety joint-type right-hand and left-hand threads which overlie each other and are disposed on the same area of said stem, an upper tubular section having internal relatively coarse safety joint-type left-hand threads formed therein and engageable with the left-hand threads on the stem of said lower section to form a connection between the lower and upper sections, a reconnecting section comprising a tubular body having relatively coarse safety joint-type internal right-hand threads and engageable with the right-hand threads on the stem of the lower section when the upper section is disconnected and removed from the lower section, and an annular guide element on the lower end of the reconnecting section for guiding the reconnecting section into position over the stem of the lower section.

4. A safety joint device including, a lower section comprising a body having a reduced portion at its upper end whereby an external annular shoulder is formed on the body, said reduced portion being formed with external relatively coarse safety joint-type right-hand and left-hand threads which overlie each other and are disposed on the same area of said stem, an upper section comprising a tubular body having relatively coarse safety joint-type internal left-hand threads for connection with the left-hand threads on said lower section to form a connection between the lower and upper sections, the lower end of said tubular body being engageable with the external shoulder on said lower section, said upper section being disconnected from the lower section by rotation in

a direction to the right, and a reconnecting section comprising a tubular body having internal relatively coarse safety joint-type right-hand threads for connection with the right-hand threads on said lower section, said reconnecting section being connected with said lower section by a right-hand rotation after the upper section has been disconnected and removed from said lower section.

5. A safety joint device as set forth in claim 5, wherein the external shoulder on the body of the lower section co-acts with the lower end of the body of the reconnecting section to limit the telescoping movement of the latter relative to the lower section when the parts are being connected, and an annular non-flexible element carried within the lower portion of the body of said reconnecting section and engageable with said external shoulder after the lower and reconnecting sections are connected together and having means coacting with said lower and reconnecting sections to limit the tightness to which the connection between the reconnecting section and the lower section may be made up, whereby subsequent separation of the sections will be facilitated.

6. A safety joint device including, a lower section comprising a body, an upstanding stem portion on the body of a diameter less than the diameter of the body whereby an external shoulder is formed at the intersection of the stem portion and body, external relatively coarse safety joint-type right-hand threads formed on the stem portion and extending throughout substantially the entire length thereof, external relatively coarse safety joint-type left-hand threads also formed on the stem portion and also extending throughout the entire length thereof, the right and left-hand threads formed by said threads intersecting each other along diametrically opposed longitudinal planes, an upper section having internal relatively coarse safety joint-type left-hand threads engageable with the left-hand threads of said lower section, and a reconnecting section having internal relatively coarse safety joint-type right-hand threads for engagement with the right-hand threads of the lower section when said upper section is removed from said lower section.

7. The combination with a well pipe string having a pair of spaced upper and lower well packers mounted thereon, of a safety joint device comprising, a lower section, an upper section and a reconnecting section, co-acting relatively coarse safety joint type right and left hand threads on the same area of the lower section and relatively coarse safety joint-type left hand threads on the upper section for connecting the sections by a left-hand rotation and for disconnecting said sections by a right-hand rotation, said upper and lower sections being connected together and being disposed in the well pipe string at a point between the spaced packers on said string, disconnection of the upper section from the lower section by a right-hand rotation of that portion of well pipe string above said upper section permitting removal of the upper packer and the pipe string above said upper section while the remainder of the pipe string, the lower section and the lower packer remain in the well bore, and a retrieving pipe to which the reconnecting section of the safety joint device is attached, the reconnecting section having co-acting relatively coarse safety joint-type right hand threads which are engageable with the relatively coarse safety joint-type right hand threads on the lower section after said retrieving pipe is lowered into contact with the lower safety joint section and thereafter rotated in a right hand direction to connect the retrieving pipe to the remaining portion of the well pipe string whereby said remaining portion and the lower well packer may be retrieved by means of said retrieving pipe, said relatively coarse safety joint type threads between the reconnecting section and the lower section assuring disconnection between these parts before disconnection of any other joint in the retrieving pipe upon a left-hand rotation of said retrieving pipe.

8. The combination with a well pipe and a washover

pipe of a safety joint device comprising a lower section, an upper section and a reconnecting section, said lower section having relatively coarse safety joint-type right and left hand threads disposed on the same area, said upper section having co-acting relatively coarse safety joint-type left hand threads connecting said upper and lower sections to each other in the well pipe by a left-hand rotation and for disconnecting said sections by a right-hand rotation, disconnection of said upper and lower sections permitting removal of the upper section and the well pipe thereabove from a well bore while leaving the lower section and the well pipe therebelow within the bore, the reconnecting safety joint section being secured to the upper end of the washover pipe and being lowerable with the washover pipe on a retrieving pipe string, whereby a washover operation may be carried out over the well pipe remaining in the bore, after which the reconnecting section engages the lower safety joint section, and co-acting relatively coarse safety joint-type right hand threads on said reconnecting section operable by a right-hand rotation of the reconnecting section for firmly connecting said reconnecting section to said lower section, whereby the retrieving pipe string may be utilized to retrieve the remainder of the well pipe string, said relatively coarse safety joint type threads between the reconnecting section and the lower section assuring disconnection between these parts before disconnection of any other joint in the retrieving pipe upon a left-hand rotation of said retrieving pipe.

9. The method of removing multiple packers which are mounted on a single well tubing string from a well bore including, separating the well tubing string at a point below the uppermost packer by imparting a right-hand rotation to the well tubing string, removing the uppermost well packer together with that portion of the well tubing string above the point of separation from the well bore, thereafter lowering a retrieving pipe within the well bore and reconnecting said retrieving pipe by imparting a right hand rotation to that portion of the well tubing string remaining within the bore, and thereafter removing said tubing string and the well packer or packers thereon by means of the retrieving pipe.

10. The method of removing multiple packers which are mounted on a single well tubing string from a well bore including, separating the well tubing string at a point below the uppermost packer by imparting a right-hand rotation well tubing string, removing the uppermost well packer together with that portion of the well tubing string above the point of separation from the well bore, thereafter lowering a retrieving pipe within the well bore and reconnecting said retrieving pipe by imparting a right-hand rotation to that portion of the well tubing string remaining within the bore, continuing the right-hand rotation after the connection is made up to effect a separation of the well tubing string at a point below the next well packer, retrieving the next well packer and the separated portion of well tubing by removing it from the well bore, and repeating the steps to remove the remaining well packers and portions of the well tubing successively from the well bore.

11. In combination with an upper and lower portion of a well pipe and a retrieving pipe wherein said lower portion of well pipe is removable from the bore, a safety joint device including, a first section having relatively coarse safety joint-type right and left hand threads formed on the same area of said first section and having connection with the lower portion of the well pipe, a second section connected with the upper portion of the well pipe and having relatively coarse safety joint-type left hand threads for connection with the left hand threads of said first section whereby the upper and lower portions of said well pipe are connected together by said sections, said sections being disconnectible by a rotation of the second section in a direction to the right to separate the upper and lower portions of the well pipe to permit removal of

the upper portion of the pipe together with said second section, and a third section carried by the lower end of the retrieving pipe and having relatively coarse safety joint-type right hand threads formed thereon for connection with the right hand threads of the first section after the second section has been disconnected therefrom and has been removed with the upper portion of the well pipe from the well whereby the retrieving pipe may be utilized to remove the lower portion of the well pipe from the bore.

12. The combination set forth in claim 11 together with a non-flexible annular element mounted within the third section and engageable with the first section when said first and third sections are fully connected and having means coacting with said first and third sections to limit the tightness to which the connection between these sections may be made up, whereby subsequent separation of said sections is facilitated.

13. A safety joint device including, a lower section having a generally cylindrical stem formed with relatively coarse safety joint-type right-hand and left-hand threads, said right-hand and left-hand threads being formed on the same area of the stem in intersecting relationship and terminating short of the ends of the stem, the annular areas between the threads and the ends of the stem forming sealing surfaces, an upper tubular section having internal relatively coarse safety joint-type left-hand threads formed within its bore and engageable with the left-hand threads on the stem of said lower section, the bore of said upper tubular section adjacent each end of the threads being smooth to provide sealing areas which are contiguous to the sealing surfaces of the stem when the lower and upper sections are connected together, sealing means between said sealing area and sealing surfaces, and a reconnecting section comprising a tubular body having internal relatively coarse safety joint-type right-hand threads formed within its bore and engageable with the right-hand threads of said lower section when the upper section has been disconnected and removed from the lower section.

14. A safety joint device as set forth in claim 13, wherein the bore of the reconnecting section adjacent each end of the right-hand threads therein is smooth to provide sealing areas which are contiguous to the sealing surfaces of the stem when the lower and reconnecting sections are connected together, and sealing means between the sealing areas of the reconnecting section and the sealing surfaces of the lower section.

15. A safety device as set forth in claim 13, together with a non-flexible annular element mounted within the lower portion of the bore of the reconnecting section, retaining means secured to the reconnecting section and confining said element to maintain said element in position, said annular element being engageable with the lower section after the lower and reconnecting sections are connected together and having means coacting with said lower and reconnecting sections to limit the tightness to which the connection between said reconnecting section and said lower section may be made up.

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