

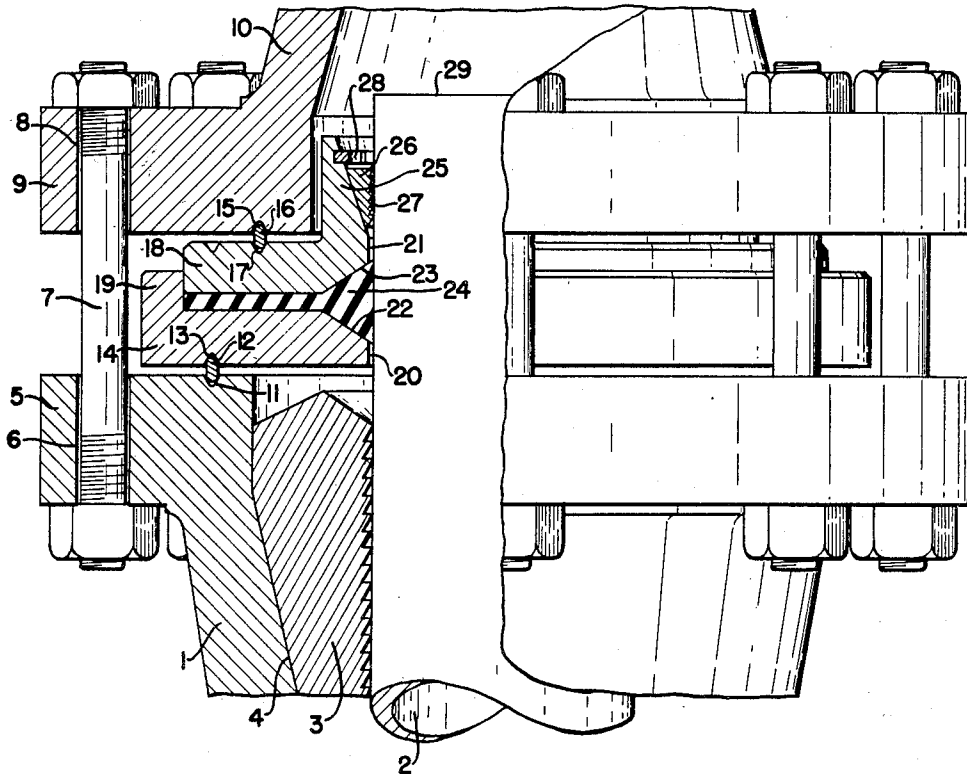
May 16, 1950

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2,508,003

SEAL ASSEMBLY AND CASING HEAD COMBINATION

Filed Jan. 23, 1947



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UNITED STATES PATENT OFFICE

2,508,003

SEAL ASSEMBLY AND CASING HEAD
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Application January 23, 1947, Serial No. 723,843

10 Claims. (Cl. 285—22)

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This invention relates in general to seal assemblies and more particularly to seal assemblies which may be used in combination with casing and tubing head arrangements on wells. The general object of this invention is to provide an improved seal assembly which will be both simple and effective in construction and in operation.

A further object of this invention is to provide a structure of the type referred to in which the seal formed by the assembly about a member such as a casing passing therethrough may be adjusted by the act of clamping to the casing head such equipment as is intended to be used above the casing head.

Another object of this invention is to provide such a structure in which the seal formed about the casing or similar member, once tightened, will remain tight and be retained even though the equipment above the seal be removed.

Other objects and advantages of this invention will become apparent from the following description taken in connection with the accompanying drawings wherein is set forth by way of illustration and example one embodiment of the invention.

In the drawings the single figure shows partly in vertical cross section and partly in side elevation a seal assembly constructed in accordance with this invention in use in combination with a casing head, tubing head and casing of a well.

In the use of this invention in connection with a casing head and other well head equipment, the casing head 1 is mounted in the usual manner such as on the upper end of a string of surface casing (not shown) and the well casing 2 is suspended therein by suitable suspending means of more or less conventional nature such as the slips 3, these slips being mounted within the tapered bowl 4 of the casing head.

The casing head at its upper end is provided with a lateral flange 5 having holes 6 therethrough for the reception of the customary studs 7. The studs 7 likewise pass through holes 8 in the flange 9 of a tubing head or similar piece of well head equipment 10.

The upper end of the casing head is provided with an annular groove 11 adapted for the reception of a metallic sealing ring 12, the upper portion of which ring is received in a corresponding groove 13 formed in the lower surface of one of the body members 14 of the seal assembly. Likewise, the lower surface of the tubing head is formed with an annular groove 15 adapted to receive a metallic seal ring 16 the lower portion of which is adapted to fit within a groove 17 in the upper body part 18 of the seal assembly.

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The body part 14 is provided about its outermost edge with an upstanding flange 19 having an inner diameter such as to receive with a relatively close but sliding engagement the outer marginal edge of the body part 18. The two body parts 14 and 18 are provided with central registering openings 20 and 21, and their edges adjacent these openings are beveled as shown at 22 and 23 respectively. Interposed between the body parts 14 and 18 and spacing them apart except at their outer edges which are in contact by virtue of the telescoping engagement between the flange 19 and the part 18, is a body 24 of relatively soft packing material flowable under pressure. This material likewise substantially fills the groove formed by the beveled edges 22 and 23, and prior to distortion, has a central opening therethrough substantially registering with the openings 20 and 21.

It will be seen that by forcing the parts 14 and 18 toward each other pressure may be applied to the body 24 of packing material and this material may be by this action forced radially inwardly into sealing engagement with the casing 2.

The upper body part 18 adjacent and about its central opening is provided with an upstanding integral flange 25 having a downwardly tapering inner surface providing a tapered bowl for receiving slips 26 or the like. These slips 26 have their teeth 27 inwardly directed and the slips are of such a diameter as to grip the outer surface of the casing 2 and substantially prevent upward movement of the body part 18 with respect to the casing. For the purpose of holding these slips in place during handling of the seal assembly a snap retaining ring 28 or the like may be employed in the upper end portion of the slip bowl.

In operation, the casing head will be mounted and the casing 2 will be run and suspended by the slips 3 in the usual manner. Thereupon the seal assembly consisting of the body parts 14 and 18, the packing 24, and the slips 26 and retaining ring 28 will be put in position about the casing with the sealing ring 12 between the casing head 1 and the body part 14. The casing either at this time or previous thereto will be severed at a point slightly above the seal assembly as shown at 29 and then the seal ring 16 and the tubing head or other well equipment 10 will be mounted above the seal assembly.

The insertion and tightening of the studs 7 will then accomplish the two-fold purpose of rendering effective the seals provided by the metallic seal rings 12 and 16, and of applying pressure to the two body parts 14 and 18 tend-

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ing to move them toward each other and force the packing 24 radially inwardly to effect a seal about the casing 2.

If for any reason it later becomes desirable to remove the member 18 this may be done by merely removing the studs 7 and lifting it off. Such action, however, will not substantially effect the seal provided by the packing 24 about the casing nor the seal provided by the ring 12 because the slips 26 will engage the casing to hold the body part 18 in its lower position in which it applies pressure against the packing 24. This pressure will, of course, keep the packing 24 in sealing engagement with the casing and will be transmitted to the body part 14 in a downward direction to keep pressure on the seal ring 12 and maintain the seal provided by this ring.

From the foregoing it will be appreciated that a seal assembly has been provided which may be employed in various associations and combinations and especially in combination with a casing head, casing and other well head equipment, including means for tightening such well head equipment together, and that the tightening of such well head equipment together will in and of itself serve to render effective the seal provided by this seal assembly about the casing.

It will further be seen that a seal assembly has been provided which will be operative to maintain a seal about a member even after the original pressure which rendered such seal effective has been withdrawn from the assembly, and that in the case of the use of the assembly in combination with a casing head and other well head equipment, the other equipment may be removed from the casing head without disturbing the seals provided by this seal assembly.

All of the objects and advantages sought by this invention will be found to have been accomplished by the structure shown and described. It will be appreciated that this structure may take various forms and that the invention is not to be limited save by the prior art and by the scope of the appended claims.

Having described my invention, I claim:

1. A seal assembly for providing a sealed engagement with a member extending therethrough comprising a pair of body parts having registering openings therethrough to receive such member and having parts along their outer edges adapted to substantially engage each other while leaving an annular space between said parts at their inner edges, a packing of material flowable under pressure substantially filling said space, one of said parts being movable along the member toward the other part to force said packing radially inwardly from said space, and a detent associated with said movable part for preventing said movable part from moving in the opposite direction along said member.

2. An assembly as set forth in claim 1 wherein the outer edge portions of said parts telescopingly engage each other.

3. An assembly as set forth in claim 1 wherein said detent comprises a slip bowl on said movable part and a set of slips in said bowl.

4. An assembly as set forth in claim 1 wherein said detent comprises a slip bowl on said movable

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part and a set of slips in said bowl, the teeth on said slips facing radially inwardly to engage and grip a member passing through said openings.

5. An assembly as set forth in claim 1 wherein the said detent comprises a slip bowl on said movable part, a set of slips in said bowl, and a retainer for loosely retaining said slips in said bowl.

6. A seal assembly for providing a sealed engagement with a member extending therethrough comprising a pair of body parts having registering openings therethrough to receive such member and having parts along their outer edges adapted to substantially engage each other while leaving an annular space between said parts at their inner edges, and a packing of a material flowable under pressure substantially filling the said space, one of said parts being movable bodily along the member toward the other part while said outer edges are in substantial engagement with each other, to force said packing radially inwardly from said space.

7. An assembly as set forth in claim 6 wherein the outer edge portions of said parts telescopingly engage each other.

8. In combination with a casing head, a member adapted to be secured to the upper end of the casing head, means interconnecting said head and member for drawing them toward each other, and a casing extending through said casing head and into said member, a seal assembly comprising a body part surrounding the casing carried by and sealed to the casing head, a second body part surrounding the casing above the first body part and having its outer edge substantially in engagement with the first body part and its inner edge spaced from said first body part to provide an annular space between said parts, and a packing of material flowable under pressure substantially filling said space, said member being in sealed engagement with the upper surface in said second part, whereby tightening of said interconnecting means will force said body parts toward each other and apply pressure to said packing to cause it to flow into sealing engagement with said casing.

9. The combination as set forth in claim 8, and a detent carried by said second body part and engaging the said casing to prevent upward movement of said body part with respect to the casing, whereby said member may be removed without disturbing the seal formed by forcing said packing radially inwardly against the casing.

10. The combination as set forth in claim 8, said two body parts being in telescoping engagement with each other at a position remote from their inner edges whereby they may be moved bodily toward and from each other within limits without disengagement from each other.

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