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E. D. SMYSER

TUBING BLEEDER

Filed March 31, 1925

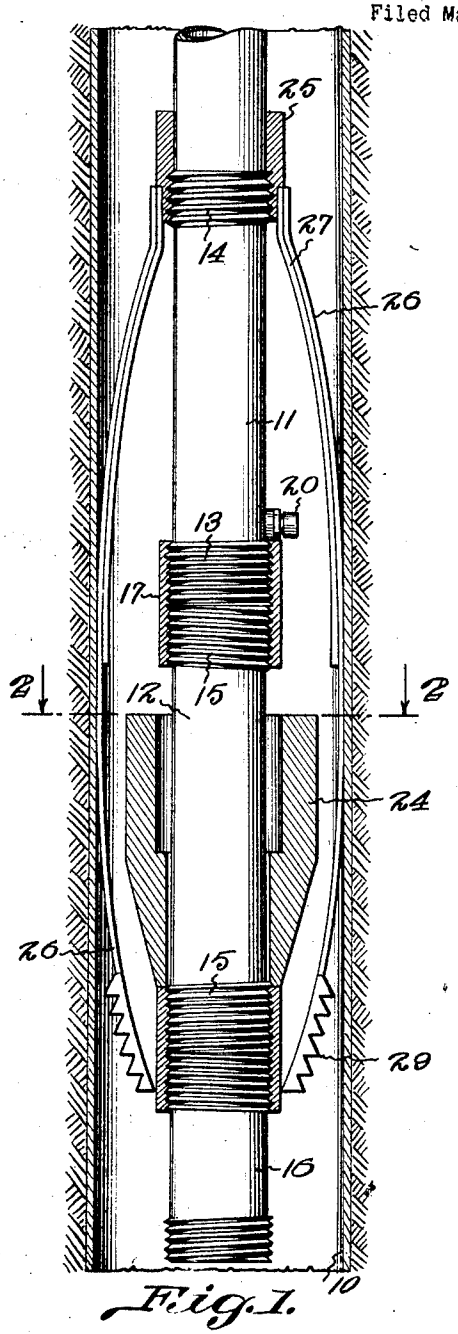


Fig. 1.

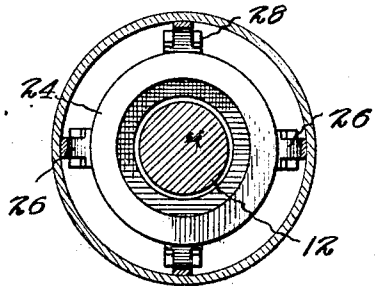


Fig. 2.

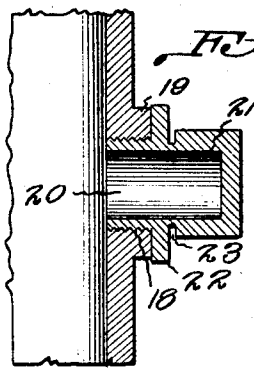


Fig. 3.

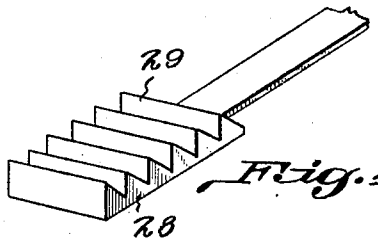


Fig. 4.

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UNITED STATES PATENT OFFICE.

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TUBING BLEEDER.

Application filed March 31, 1925. Serial No. 19,744.

This invention relates to improvements in means for bleeding or draining oil tubes or the like.

An important object of the invention is to provide a device of this character which will permit automatic drainage of the pump tube by suitably actuating the same.

A further object of the invention is the provision of a device of the above mentioned character whereby oil or other liquid matter may be drained therefrom to permit convenient elevation of the tubing.

A still further object of the invention is the provision of a tubing bleeder which is comparatively simple, yet durable of construction and efficient for the purpose intended.

Other objects and advantages of this invention will become apparent as the description progresses.

In the accompanying drawing forming a part of this specification and in which like numerals are employed to designate like parts throughout the same:

Figure 1 is a side elevation of my improved mechanism partially broken away, shown in association with a well casing,

Figure 2 is a transverse sectional view taken on the line 2—2 of Figure 1,

Figure 3 is an enlarged longitudinal section view showing the attachment of the bleeder plug, and

Figure 4 is a perspective view showing in detail a portion of the apparatus.

In the drawing, wherein for the purpose of illustration is shown the preferred embodiment of my invention, the numeral 10 generally designates the common type of well casing widely employed in connection with oil wells and similar operations. It is customary to sink tubing of substantially smaller diameter within the casing for operation of the pump mechanism, this tubing being composed of a plurality of sections positioned into and connected by suitable couplings, not shown.

In the operation of wells of this character it is well known that the pump valve mounted on the lower extremity of the tubing through which the liquid matter is drawn, often becomes inoperative due to some obstruction collecting upon the seat thereof or other causes such as broken valve structure and the like. In order to repair or replace the valve it is necessary to withdraw the entire line of tubing from the well. To permit convenient pulling of the tubing it is very essential that means be provided for draining the liquid matter therefrom. This is most effectively accomplished by the provision of automatic draining means but difficulty is encountered in obtaining suitable devices for this purpose. The type of apparatus now employed for this purpose is inefficient and impractical due to the extreme difficulty in operating the same. My apparatus is therefore designed to provide a device of comparatively simple construction, yet positive in operation and durable.

Referring now more particularly to the device comprising my invention, I suggest the removal of the lowermost section of the pump tubing and connect in place thereof a plurality of comparatively short sections 11 and 12. The upper section 11 is provided with external threads 13 at the lower extremity and similar threads 14 upon the intermediate portion thereof. The lower section 12 is provided with externally threaded portions 15 at each extremity and is connected to the upper section 12 and upper extremity of the main section 16 by means of internally threaded connecting sleeves 17.

The upper sub-section 11 is provided, immediately above the lower threaded portion 13, with an internally screw threaded opening 18 having formed about the outer edge thereof a suitable collar 19. Externally threaded and adapted to threadedly engage the opening 18 is a bleeder plug 20 comprising a body 21 having formed about the intermediate portion an annular ring 22 engageable with the collar 19 in order to provide a tight connection. The outer extending portion of the body 21 is provided with an annular groove 23 immediately adjacent the ring 22 and extending approximately through one-half the thickness of the material comprising the body.

Slidably mounted upon the section 12 is an actuating sleeve 24 the inner diameter of the lower portion being substantially greater than the tube sections and the upper portion of increased diameter so as to be loosely slidable over the upper collar 17. The outer contour of the upper portion of the sleeve 24 is cylindrical in form while the lower portion is tapered, the lower extremity being substantially the same outer diameter as the lower collar member which

restricts the downward movement of the sleeve.

A cylindrical frame collar 25 is slidably mounted upon the pump tubing and the lower portion internally screw threaded for engaging with the upper threaded portion 14 of the section 11. This frame collar 25 carries a plurality, in the present instance four, outwardly bowed spring ribs 26 secured to the lower portion of the collar in any preferred manner and reinforced at the upper portion by auxiliary ribs 27. These ribs normally assume an expanded position substantially greater than the diameter of the well casing and when positioned within the casing will frictionally engage the inner side thereof. The lower portions of the ribs 26 are provided with enlarged plates 28 the outer faces thereof being serrated as at 29 to provide gripping means when expanded against the casing.

The operation of the device is as follows:

When the pump tubing is being inserted within the well casing the frame collar 25 is threadedly associated with the section threads 14 causing the spring ribs to move downwardly with the tubing. The cylindrical sleeve 24 will naturally remain seated upon the lower collar 17 as shown in Figure 1, by force of gravity and remain inoperative until it is desirable to withdraw the tubing.

When it is desirable to withdraw the tubing from the well casing the fluid is released from the tubing in the following manner:

The pump tubing is rotated by the application of a suitable wrench to the upper extremity causing the frame collar 25 to be disengaged from the threads 14, due to the stationary position of the collar by frictional contact of the ribs 26. The pump tubing is then lowered causing the sleeve 24 to engage the lower extremities of the ribs and contact with the inner faces of the plates 28 the tapered contour of the sleeve 24 spreading the plates and forcing same into positive engagement with the well casing. The plates 28 will therefore remain in a stationary position in engagement with the casing and prevent downward movement of the sleeve 24 permitting same to slide relative to the pump tubing. It is clearly apparent that continued downward movement of the tubing will cause the sleeve 24 to strike the plug extension 21 and sever the same from the main body. Due to the annular groove 23 formed in the plug body the fracture of the plug will naturally be in this section in a continuous and comparatively even manner. The liquid contained in the tubing will thus be permitted to flow into the casing and the pump tubing suitably drained.

It can be readily seen that the device is very positive and efficient in operation and can be handled without difficulty. It will be furthermore noted that the provision of this particular device upon the pump tubing can be accomplished at a reasonable cost and without material alteration in the construction of the conventional apparatus usually employed.

It is to be understood that the form of my invention herewith shown and described is to be taken as the preferred example of the same and that various changes as to the shape, size and arrangement of parts may be resorted to without departing from the spirit of the invention or the scope of the subjoined claims.

Having thus described my invention, I claim:

1. The combination with a pump tube, a bleeder plug mounted in the said tube and including a body having a closure head, and means for disconnecting the head of said plug from the body of the same.

2. The combination with a pump tube, a bleeder plug mounted in the said tube, means for engaging the extended portion of the said plug, and means for moving the said tube relative to the said plug engaging means.

3. The combination with a pump tube, a bleeder plug having an extended head mounted in the said tube, a striking element mounted in association with the said tube, and means for forcibly striking the said plug against the said striking element.

4. The combination with a pump tubing, a bleeder plug mounted in the said tubing, an outwardly extending head formed on the bleeder plug, a sliding sleeve member mounted about the said tubing, and means for moving the said tubing relative to the sliding sleeve member and forcing the head from the plug body.

5. In combination with a well casing and pump tubing therein, a bleeder plug mounted in the casing and projecting therefrom, a striking sleeve member slidably mounted on the tubing, means for limiting the movement of the sleeve member relative to the movement of the tubing and means whereby the sleeve may engage the bleeder plug and permit drainage of the fluid therein.

6. In combination with a well casing and pump tubing positioned within the said casing, a bleeder plug having an extension mounted in the tubing and extending outwardly therefrom, means for striking the bleeder plug extension including a sleeve slidably mounted upon the tubing, and sleeve actuating means including a frame collar threadedly mounted in association with the tubing, a plurality of spring ribs carried by the collar engageable with the casing, and extensions formed on the ribs for engaging and operating the said sleeve member.

7. A tubing bleeder for wells including a tubing section having an opening, a member mounted for closing said opening, fragile means retaining said member in closing position, and means operable upon movement of the tubing section for dislodging said member by destruction of said fragile means.

8. A tubing bleeder for wells including a tubing section having an opening, a member mounted for closing said opening, fragile means retaining said member in closing position, and means operable upon lowering of the tubing section for displacing said member against the action of said fragile means.

9. In a tubing bleeder for wells, a bleeder plug including a hollow member adapted to be detachably secured in an opening of a tubing section and provided with an open inner end and a closed outer end, said plug embodying a plurality of portions having fragile means securing them together.

10. In a tubing bleeder for wells, a bleeder plug including a hollow member adapted to be detachably secured in an opening of a tubing section and provided with an open inner end and a closed outer end, said plug embodying a plurality of portions having fragile means securing them together, the wall of said hollow member being weakened between said portions to form said fragile means.

11. In a tubing bleeder for wells, a bleeder plug including a hollow member adapted to be detachably secured in an opening of a tubing section and provided with an open inner end and a closed outer end, said plug embodying a plurality of portions having fragile means securing them together, the wall of said hollow member being weakened by the provision of an annular groove therein between said portions to form said fragile means.

12. In a tubing bleeder for wells, a bleeder plug including a hollow member adapted to be detachably secured in an opening of a tubing section and provided with an open inner end and a closed outer end, said plug embodying a plurality of portions having fragile means securing them together, the wall of said hollow member being weakened by the provision of an external annular groove therein between said portions to form said fragile means.

13. In a tubing bleeder for wells, a tubing section having a side opening provided with a threaded wall, and a bleeder plug movably threaded in said opening and including a body having an outwardly projecting closure head connected thereto by fragile means.

14. A tubing bleeder for wells including a tubing section having a side opening, a bleeder plug closing said opening and having an outwardly extending closure member, fragile means receiving said closure member in closing position, a striker member engageable with the closure member and displaceable relative to the tubing section for displacing the closure member against the action of said fragile means, and means for displacing said striker member.

15. The combination with a well casing, and pump tubing positioned in said casing and provided with a bleeder opening, of a destructable closure plug for said bleeder opening, and means to automatically cause destruction of said closure plug upon movement of said tubing relative to said casing.

16. The combination with a well casing, and pump tubing positioned in said casing and provided with a bleeder opening, of a destructable closure plug for said bleeder opening, and means to cause destruction of said closure plug.

17. The combination with a well casing, pump tubing therein having a bleeder opening, and a closure for said bleeder opening, of a member displaceable longitudinally of said tubing for opening said closure, means to automatically displace said member upon movement of the tubing relative to said casing, said last named means embodying a frame mounted on the tubing and engageable with the well casing for being held stationary with the latter when the tubing is so moved, said frame embodying outwardly bowed spring ribs arranged to engage said displaceable member and to frictionally engage the well casing, and means to positively retain the frame against movement relative to the well casing upon engagement of the spring ribs thereof with said displaceable member.

18. A tubing bleeder including means applicable to the lower end portion of well tubing for automatically opening the bleeder valve of the latter upon lowering of said tubing while operatively positioned in a well, said means including a valve opening member through which the tubing is slidable and elements engageable with the well casing to restrain the valve opening member from lowering with the tubing when the latter is so lowered, whereby the valve opening member is caused to engage and open said bleeder valve when the tubing is so lowered, and means to releasably secure said elements to the tubing for causing said elements to lower with the tubing when the latter is lowered into the well casing, said releasable securing means being constructed to permit the tubing to be turned relative to said elements after the tubing is so lowered for releasing said elements from the tubing and allowing subsequent further lowering of the tubing relative to said elements while the latter engage the casing to restrain themselves against further movement relative to the casing.

In testimony whereof I affix my signature.

ELMER D. SMYSER.