

Aug. 20, 1940.

B. E. PARRISH

2,212,040

OIL SAVER

Filed May 28, 1938

2 Sheets-Sheet 1

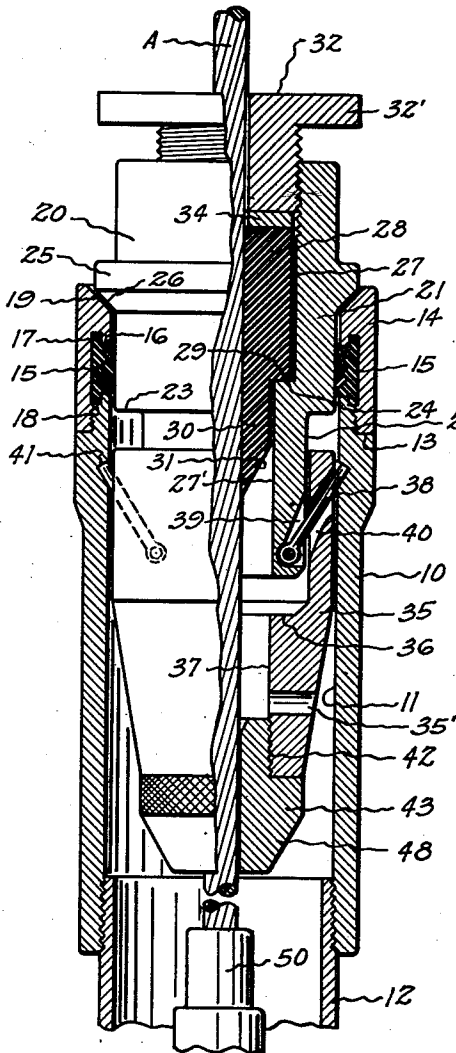


Fig. 1.

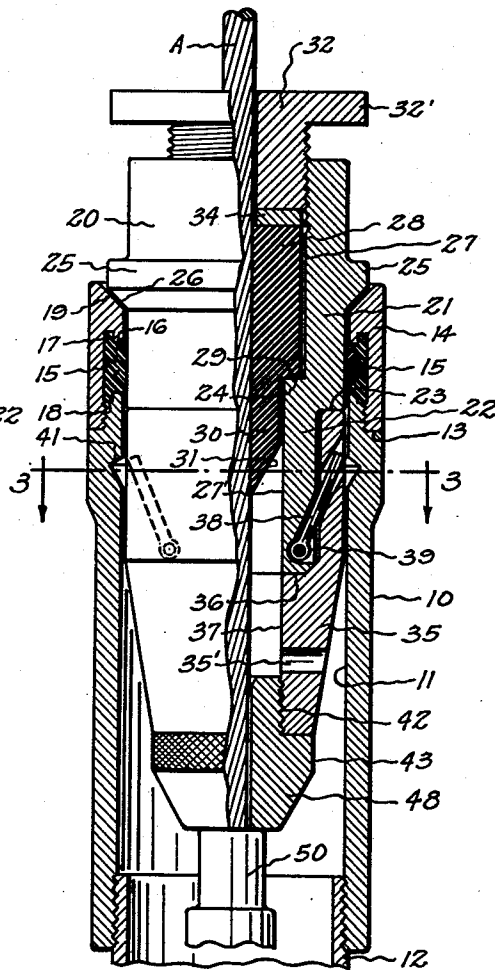


Fig. 2.

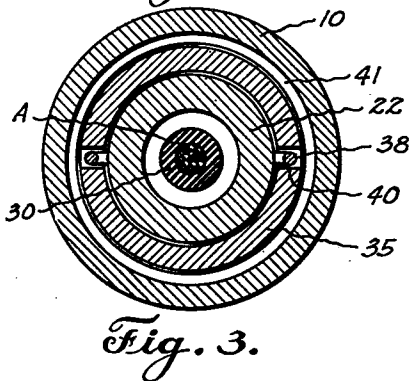


Fig. 3.

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2 Sheets-Sheet 2

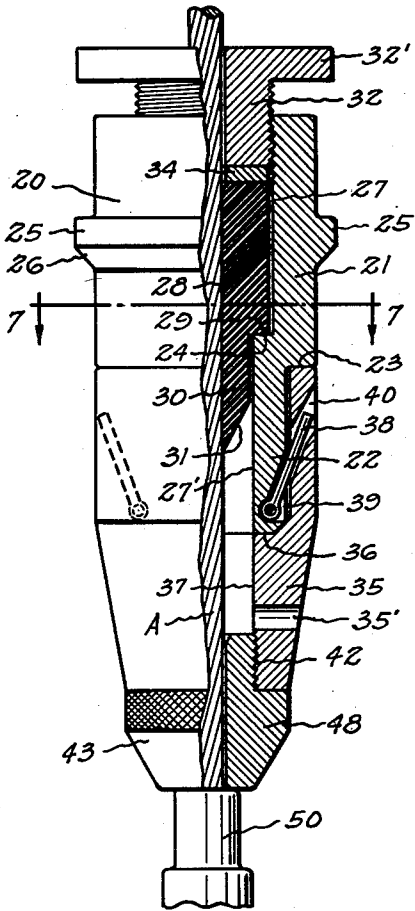


Fig. 4.

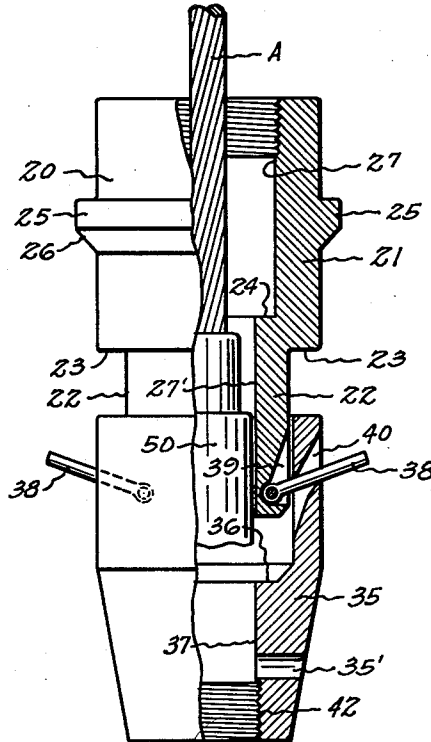


Fig. 5.

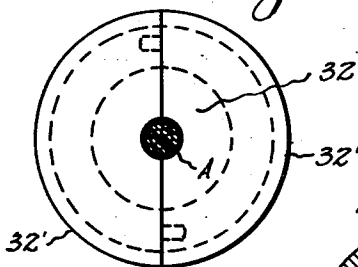


Fig. 6.

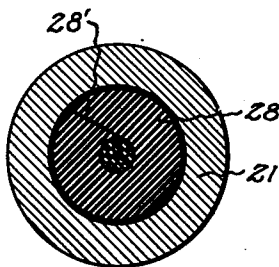


Fig. 7.

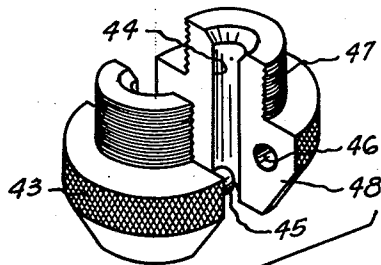


Fig. 8.

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UNITED STATES PATENT OFFICE

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OIL SAVER

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15 Claims. (Cl. 166—14)

This invention relates to new and useful improvements in oil savers.

One object of the invention is to provide an improved device for closing the upper end of a well pipe or casing and having means for effectively packing off around a cable, or other element, which is being run into or out of said well casing, whereby escape of oil, gas, or other fluid is prevented.

An important object of the invention is to provide an improved oil saver wherein the packing unit may be lowered into or removed from its packing position by means of a drilling tool or "chuck" mounted on the cable which extends through the unit, said unit being so constructed that the cable may be threaded through and removed from the bore of the unit without removing said tool or chuck, thereby making it possible to insert or remove the cable from the unit without separating the chuck therefrom, which results in a saving of time and labor while performing various well operations.

A particular object of the invention is to provide an oil saver having improved latching means for locking the packing unit in its seated position, said latching means moving to locked position when the unit is seated and being automatically released when an upward movement is imparted to the unit, whereby manual manipulation to lock or unlock the unit in place, is unnecessary.

A further object of the invention is to provide a device of the character described, having improved means for closing the upper end of the well casing, as well as improved sealing means for packing off around the cable, or other element extending through the device into the well casing.

Still another object of the invention is to provide an improved packing unit for an oil saver which unit is formed with a bore sufficiently large to pass a chuck or tool secured to the cable, or other element passing through the unit, said bore being arranged to receive an adapter after the chuck has been lowered therethrough, whereby the adapter reduces the size of the bore so that the cable, or other element is held axially in said bore; the adapter also providing a means engageable by the chuck, or tool, to permit raising and lowering the unit by the cable, or other element, carrying said chuck.

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

The invention will be more readily understood

from a reading of the following specification and by reference to the accompanying drawings, in which an example of the invention is shown, and wherein:

Figure 1 is a view partly in elevation and partly in section of an improved oil saver constructed in accordance with the invention, and showing the same in its seated and locked position,

Figure 2 is a view similar to Figure 1 and showing the latching members moved inwardly with the packing unit of the device being capable of being removed,

Figure 3 is a horizontal, cross-sectional view taken on the line 3—3 of Figure 2,

Figure 4 is a view partly in elevation and partly in section of the packing unit, and showing the same supported on the chuck or tool carried by the cable,

Figure 5 is a view similar to Figure 4 with the cable being removed from the packing unit,

Figure 6 is a plan view of the packing unit,

Figure 7 is a horizontal, cross-sectional view taken on the line 7—7 of Figure 4, and

Figure 8 is an isometric view of the split adapter which is insertable in the bore of the packing unit.

In the drawings, the numeral 10 designates an elongate shell or body having an axial bore 11 extending therethrough. The lower end of the bore 11 is internally screw-threaded, whereby the body may be mounted on the usual well casing 12 or other support. The upper end of the shell is provided with an external shoulder 13 and a collar 14 is adapted to be threaded onto the upper end of said shell so that its lower end engages the external shoulder 13. It is preferable that the outer diameter of the collar 14 be substantially the same as the outer diameter of the upper portion of the shell, whereby said collar forms a continuation of the shell when in position thereon. A packing ring 15 is confined between an inwardly directed, overhanging shoulder 16 and the upper edge of the shell 10. The packing ring 15 is formed with annular ribs 17 which engage annular recesses or grooves 18 provided in the shoulder 16 and in the upper edge of the shell (Figure 1), whereby displacement of the ring 15 is prevented. The inner upper end of the collar 14 is bevelled or inclined to form a bevelled seat 19.

A packing unit or assembly 20 is arranged to be inserted within the shell 10 and this unit includes an annular body 21. The body 21 is reduced at its lower portion 22 whereby an external, annular shoulder 23 and an internal

shoulder 24 are formed. An external, annular flange 25 is preferably made integral with the upper portion of the body 21 and the underside of this flange is inclined or bevelled at 26, which bevel is complementary to the inclination of the bevelled seat 19, and when the body 21 is inserted within the shell, the flange engages the seat, whereby the body 21 is supported within the shell. When so supported, the packing ring 15 at the upper end of the shell 10 engages the outer surface of the body 21 so as to pack off the annular space between said body and the bore of the shell.

Due to the reduction in diameter of the lower portion of the body 21, the upper end 27 of the bore of said body is of a larger diameter than the lower portion 27' of said bore. A cable A or other element is arranged to extend axially through the body 21 and shell 10, as will be hereinafter explained, and to pack off and seal around this element, an elongate packing member 28 is located within the body 21. The packing member 28 is provided with a vertical slit 28' which extends throughout its length and, with such arrangement, it is possible to engage said packing member around the cable A or to disengage it therefrom without threading the cable through the packing element. The packing member is inserted within the upper portion 27 of the bore of the body and is formed with an external shoulder 29 arranged to seat or rest upon the internal shoulder 24 formed within the body. A depending skirt 30 is formed on the packing member and this skirt has its lower end inclined inwardly as shown at 31. It is preferable that the outer diameter of the skirt be slightly smaller than the diameter of the reduced portion 27' of the bore of the body 21.

The packing member 28 is retained within the bore and is moved into sealing position by a suitable split packing gland 32 which is insertable into the upper end of the bore 27 of the body. The gland is formed with a flange 32' and is threaded into the upper end of the bore of the body 21. A suitable split metallic ring 34 may be interposed between the lower end of the gland 32 and the packing member 28 and, obviously, when the gland is screwed into the bore, the packing member 28 is distorted into sealing engagement with the bore of the body 21 and with the outer surface of the cable or other element A. Thus, it will be seen that when the body 21 is in the shell 10, the packing ring 15 will seal off between the bore of the shell and the outer surface of the body 21, while the packing member 28 will pack off between the cable and the bore of the body.

For locking the packing assembly in its seated position within the bore of the shell 10, an elongate sleeve 35 is slidable on the lower reduced portion 22 of the body 21. This sleeve is formed with an internal, annular shoulder 36 which is adapted to abut the lower end of the body 21 when the sleeve is in its upper or raised position. The sleeve is so constructed that when the shoulder 36 is abutting the lower edge of the body 21, the upper end of the sleeve is abutting the external shoulder 23 formed on said body, as is clearly shown in Figure 2. The bore 37 of the sleeve is of substantially the same diameter as the reduced portion 27' of the bore of the body so as to form a continuation thereof. It is preferable that the outer surface of the sleeve be tapered inwardly at its lower end to facilitate insertion of the packing unit into the shell.

The sleeve is secured to the lower end of the body by latch pins 38, which have their inner ends pivoted within recesses 39 provided in the exterior surface of the lower end of the body 21. The pins project outwardly through radial, inclined openings 40 which are formed in the upper portion of the sleeve 35. It is noted that the openings 40 have a larger diameter than the pins 38, whereby each pin is capable of a limited movement within its respective opening. The outer ends of the pins are adapted to engage within an annular groove or recess 41 which is formed within the bore 11 of the shell 10 near the upper end of said bore. The groove or recess 41 is angular in cross-section as is clearly shown in Figures 1 and 2.

The lower end of the bore 37 of the sleeve 35 is provided with screw threads 42, whereby a split adapter collar 43 may be mounted within said bore. The adapter collar is clearly shown in Figure 8 and comprises two identical halves or sections, each of which includes an enlarged lower end and a reduced upper end. When the sections are placed together, dowel pins 45 which extend outwardly from one section, engage within complementary openings 46 in the other section to assure proper alinement of the sections. Each section is formed with a vertical recess 44 located centrally of its face, while the reduced upper end of said sections is provided with external screw threads. When said sections are alined with each other, they form an adapter having an enlarged head 48 at its lower end with an externally threaded nipple extending upwardly therefrom. The alined recesses 44 of the sections form an axial bore through which the cable A may extend. When the nipple 47 is screwed into the bore 37 of the sleeve, the head 48 abuts the lower end of the sleeve 35 and, manifestly, the provision of the adapter reduces the size of the bore 37, whereby the cable is maintained in axial alinement with said bore. The underside of the adapter is arranged to be engaged by a chuck 50, or other tool which is secured on the cable A. It is noted that the diameters of the bore 37 of the sleeve 35 and the diameter of the bore 27' of the body are sufficient to permit the chuck or tool 50 to pass freely therethrough.

In mounting the oil saver, the packing member 28, split ring 34 and split gland 32, as well as the adapter 43, are removed from the packing unit 20, as shown in Figure 5. At this time, the packing unit is removed from the shell 10 and the sleeve 35 is in the position shown in Figure 5, being retained on the body 21 by the latch pins 38. The cable A, having the chuck or tool 50 secured thereon, is then threaded through the bore of the body 21 and through the bore of the sleeve 35. After the chuck 50 on the cable A has moved below the lower end of the sleeve 35, the split adapter 43 is engaged around the cable above the chuck. The adapter is then screwed into the lower end of the bore 37 of the sleeve 35, after which the sleeve and body may be lowered so that the adapter rests upon the chuck 50. The packing member 28 is then engaged around the cable and inserted within the bore on top of the packing member and finally the split gland 32 is positioned above the ring. The gland is then threaded into the bore, which moves the gland 32 downwardly to distort the packing member 28 into its sealing position.

The packing assembly is thus supported upon the chuck 50 carried by the cable A and when so supported, with the pins in the position shown

in Figure 4, and with the sleeve 35 in its upper or raised position on the body 21, the upper end of the sleeve is engaging the external shoulder 23 on the body, while the internal shoulder 36 of the sleeve is engaging the lower end of the body. Due to the inclination of the openings 40 through which the latch pins 38 project, said latch pins have been moved to an inner position, whereby their outer ends are completely within the openings 40. So long as the weight of the packing unit is supported on the chuck 50, the pins will remain in this position.

After the packing unit has been assembled as above described, the cable A is disposed over the shell 10 which is mounted on the upper end of the well casing 12 and, as the cable is lowered, the packing unit, supported on the chuck 50 carried by said cable, is lowered into the bore of said shell. Such lowering is permitted because the latch pins 38 are in a retracted position. Downward movement of the cable and packing unit is continued until the flange 25 on the body 21 engages the bevelled seat 19 at the upper end of the collar 14. When this occurs, further downward movement of the body 21 is prevented. The latch pins 38 are so located on the body and the groove or recess 41 is so located within the bore of the shell, that when the flange 25 engages the seat 19, the outer ends of the pins are located opposite the grooves or recesses 41, as is clearly shown in Figure 2.

After the flange 25 is seated, the cable continues its downward movement which causes the sleeve 35 to be lowered with relation to the body 21. This downward movement of the sleeve with relation to the body causes the inclined upper surfaces of the openings 40 to engage the pins 38 and swing said pins outwardly, whereby the outer ends of said pins engage within the groove or recess 41 in the shell 10. As soon as said pins engage said recess, the sleeve 35 is suspended from the pins and further downward movement thereof is prevented. Manifestly, the engagement of the latch pins in the recess 41 locks the packing unit against upward movement in the shell 10 and, therefore, the danger of a pressure within the well casing blowing or forcing the packing unit upwardly from the shell, is prevented. The cable may then be run through the device without loss of pressure. If the cable is being pulled upwardly through the device, oil, or other liquid, which may adhere to the cable is, stripped from the cable by the packing member 28 and this liquid can escape from the bore of the sleeve 35 through outlet ports 35' provided for this purpose.

When it is desired to remove the packing unit 20, it is only necessary to raise the cable until the chuck or tool 50 strikes the underside of the adapter 43. Continued upward movement of the cable will raise the sleeve 35 to the position shown in Figure 2, whereby the lower inclined surface of each opening 40 engages its respective pin to swing said pin to its retracted position. After the pins have been swung inwardly, a continued upward movement on the cable will raise the entire packing unit from within the shell 10. After the packing unit is removed from the shell, the packing gland 32, ring 34, and packing member 28 may be readily removed from the upper end of the body. After this is done, the split adapter 43 may then be unscrewed from the bore 37 of the sleeve 35. It is then possible to raise the cable and chuck 50 upwardly through the bore of the sleeve 35 and the body 21, whereby the unit may be disengaged from the cable.

It is pointed out that the provision of the adapter 43 is an important feature of the invention as its use makes it possible to engage or disengage the packing unit around the cable without the necessity of removing the chuck or tool 50. Heretofore, it has been necessary to remove the chuck or tool each time it was desired to disengage the packing unit from the cable. This was necessary because the bore of the packing unit was not of sufficient diameter to pass the tool or chuck. In the present structure, the bore of the body and sleeve is made of a sufficient diameter to permit passage of the chuck or tool 50 and the adapter is provided so as to guide the cable axially within the enlarged bore, as well as to provide a means engageable by the chuck or tool so as to permit lowering and raising of the packing unit by means of the chuck.

The foregoing description of the invention is 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 and desire to secure by Letters Patent is:

1. An oil saver for closing the upper end of a well casing and for packing off around an element carrying a well tool including, a shell mounted on the well casing, a packing unit insertable within the shell and having a bore through which the element extends, said bore being of sufficient diameter to pass the tool carried by the element, and means for reducing the size of the lower end of said bore after the tool and element have been threaded therethrough.

2. An oil saver for closing the upper end of a well casing and for packing off around an element carrying a well tool including, a shell mounted on the well casing, a packing unit insertable within the shell and having a bore through which the element extends, said bore being of sufficient diameter to pass the tool carried by the element, and means for reducing the diameter of the lower end of said bore after the tool and element have been threaded therethrough, said closing means being adapted to be engaged by the tool whereby the packing unit may be lowered and raised by means of the element and tool.

3. An oil saver for closing the upper end of a well casing and for packing off around an element carrying a well tool including, a shell mounted on the well casing, a packing unit insertable within the shell and having a bore through which the element extends, said bore being of sufficient diameter to pass the tool carried by the element, means for closing the lower end of said bore after the tool and element have been threaded therethrough, and swinging means for locking the packing unit against upward movement in the shell.

4. An oil saver for packing off around an element having a well tool secured thereon including, a support, a packing unit adapted to seat within said support and having a bore of sufficient diameter to pass the well tool therethrough, a split packing member insertable within the packing unit and engageable around the element after said element is extending through the unit, and means insertable in the lower end of the bore of said unit and arranged to be engaged with the well tool on the element, whereby the packing unit may be raised and lowered by said element and tool.

5. An oil saver for packing off around an element having a well tool secured thereon including, a support, a packing unit adapted to seat within said support and having a bore of sufficient diameter to pass the well tool therethrough, a split packing member insertable within the packing unit and engageable around the element after said element is extending through the unit, means insertable in the lower end of the bore of said unit and arranged to be engaged with the well tool on the element, whereby the packing unit may be raised and lowered by said element and tool, and swinging means for locking the packing unit against upward movement in the support.

6. An oil saver for packing off around an element having a well tool secured thereon including, a support, a packing unit adapted to seat within said support and having a bore of sufficient diameter to pass the well tool therethrough, a split packing member insertable within the packing unit and engageable around the element after said element is extending through the unit, and a split adapter arranged to be engaged around the element above the well tool thereon and insertable within the lower end of the bore of the packing unit to reduce the diameter of the same, whereby the well tool may engage said adapter to support the unit and the unit may be raised and lowered by the tool and element.

7. An oil saver for packing off around an element having a well tool secured therein including, a support, a packing unit adapted to seat within said support and having a bore of sufficient diameter to pass the well tool therethrough, a split packing member insertable within the packing unit and engageable around the element after said element is extending through the unit, a split adapter arranged to be engaged around the element above the well tool thereon and insertable within the lower end of the bore of the packing unit to reduce the diameter of the same, whereby the well tool may engage said adapter to support the unit and the unit may be raised and lowered by the tool and element, and swinging means for locking the packing unit against upward movement in the support.

8. An oil saver for packing off around an element having a well tool secured thereon including, a support, a packing unit adapted to seat within said support and having a bore of sufficient diameter to pass the well tool therethrough, a split packing member insertable within the packing unit and engageable around the element after said element is extending through the unit, means insertable in the lower end of the bore of said unit and arranged to be engaged with the well tool on the element, whereby the packing unit may be raised and lowered by said element and tool, and pivoted means on the packing unit and engageable with the support for locking the unit against upward movement in the support.

9. An oil saver for packing off around an element having a well tool secured thereon including, a support, a packing unit adapted to seat within said support and having a bore of sufficient diameter to pass the well tool therethrough, a split packing member insertable within the packing unit and engageable around the element after said element is extending through the unit, means insertable in the lower end of the bore of said unit and arranged to be engaged with the well tool on the element, whereby the packing unit may be raised and lowered by said

element and tool, pivoted latches on the packing unit and engageable with the support when the unit moves into seated position for locking said unit against upward movement in the support, and means on the unit for swinging the latches to a retracted position to permit removal of the unit.

10. An oil saver including, a support, an annular body adapted to seat within the support and having a cable extending therethrough, a packing member within the body and surrounding the cable to pack off therearound, upwardly directed pivoted latches carried by the body and adapted to engage the support to lock the body against upward movement in the support when said body is moved to operate said latches, and a sleeve slidable on the body for swinging the latches to a retracted position upon upward movement of said sleeve.

11. An oil saver including, a support, an annular body adapted to seat within the support and having a cable extending therethrough, means for packing off between the body and support, a packing member within the body and surrounding the cable to pack off therearound, upwardly extending pivoted latches carried by the body and adapted to engage the support to lock the body against upward movement in the support when said body moves to a seated position, and a sleeve slidable on the body for swinging the latches to a retracted position upon upward movement of said sleeve.

12. As a sub-combination in an oil saver, a packing unit for sealing off around an element having a well tool attached thereto including, an annular body having a bore of sufficient size to permit passage of the well tool therethrough, a packing member insertable within the body and engageable around the element while said element is extending through the body, means for supporting the packing member within said body, and a split adapter engageable around the element above the well tool and arranged to be fastened in the lower end of the bore of the body to reduce the diameter thereof.

13. As a sub-combination in an oil saver, a packing unit for sealing off around an element having a well tool attached thereto including, an annular body having a bore of sufficient size to permit passage of the well tool therethrough, a packing member insertable within the body and engageable around the element while said element is extending through the body, means for supporting the packing member within said body, a split gland engageable around the element and insertable within the upper end of the bore so as to engage the packing member, means for forcing the gland downwardly to distort the packing member into sealing position, and a split adapter engageable around the element above the well tool and arranged to be fastened in the lower end of the bore of the body to reduce the diameter thereof.

14. An oil saver for closing the upper end of a well casing and for packing off around an element carrying a well tool including, a shell mounted on the well casing, a packing unit insertable within the shell and having a bore through which the element extends, said bore being of sufficient diameter to pass the tool carried by the element, means for closing the lower end of said bore after the tool and cable have been threaded therethrough, and means actuated by the pressure within the casing for locking the

packing unit against upward movement in the shell.

15. An oil saver for packing off around an element having a well tool secured thereon including, a support, a packing unit adapted to seat within said support and having a bore of sufficient diameter to pass the well tool there-through, a split packing member insertable within the packing unit and engageable around the element after said element is extending through the unit, a split adapter arranged to be engaged

around the element above the well tool thereon and insertable within the lower end of the bore of the packing unit to reduce the diameter of the same, whereby the well tool may engage said adapter to support the unit and the unit may be raised and lowered by the tool and element, and means actuated by pressure below the same for locking the packing unit against upward movement in the support.

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