Sept. 8, 1959 O. M. HALL 2,903,067

ADAPTER FOR DROP PIPE IN DRILLED WELL CASINGS

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Fig. 1

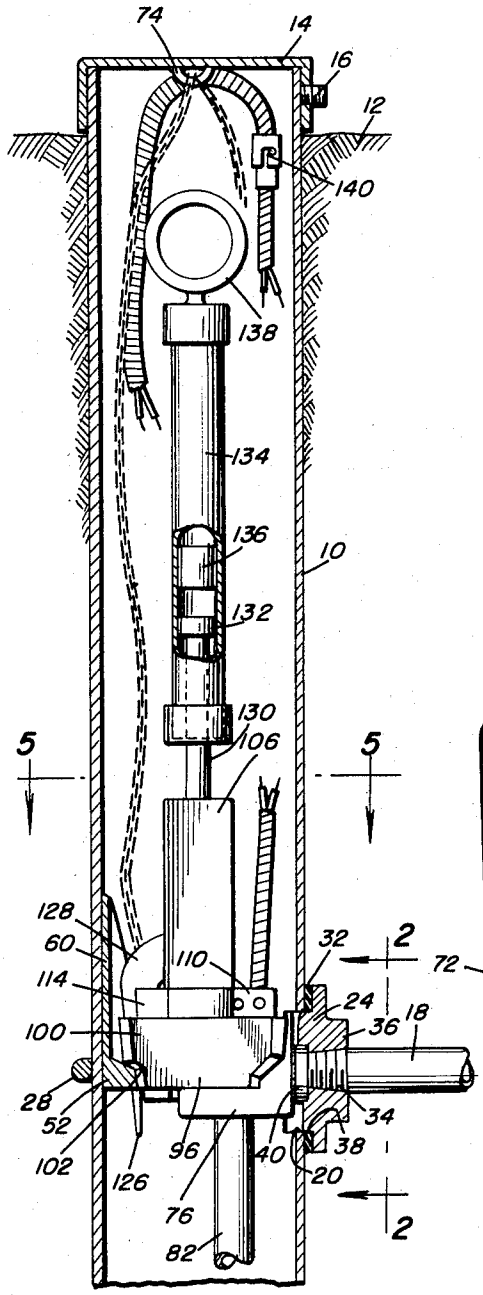


Fig. 2

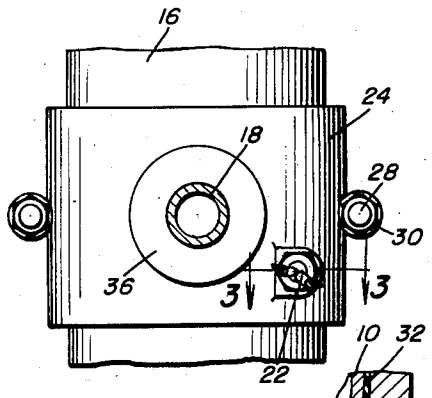


Fig. 3

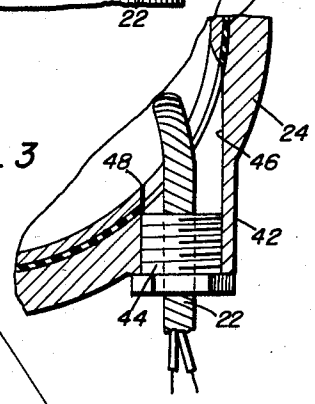
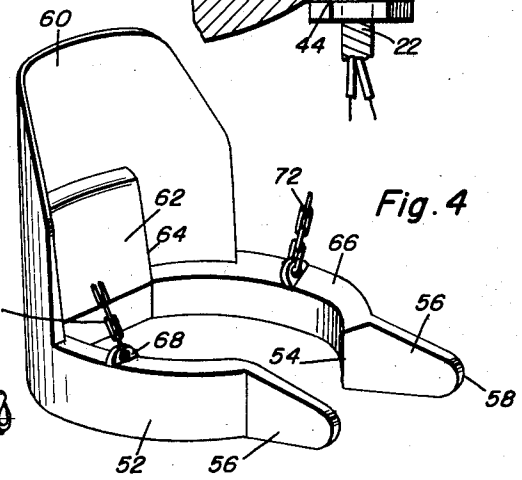


Fig. 4



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Fig. 5

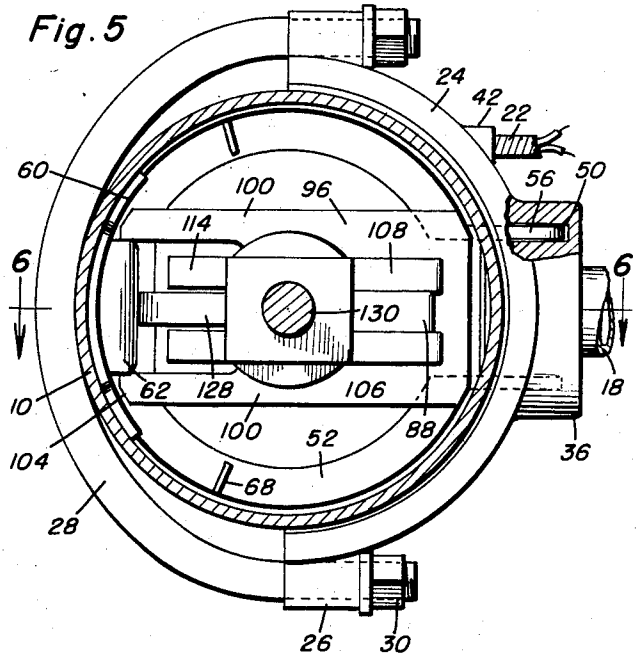


Fig. 7

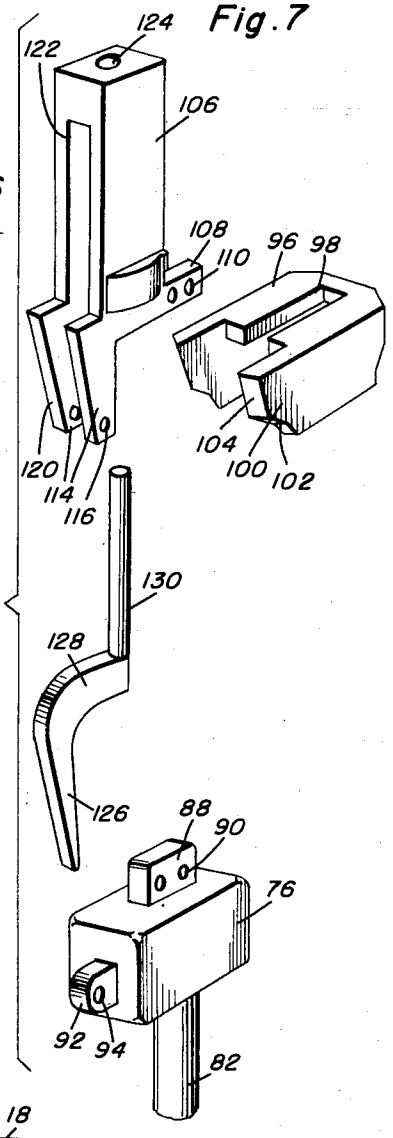
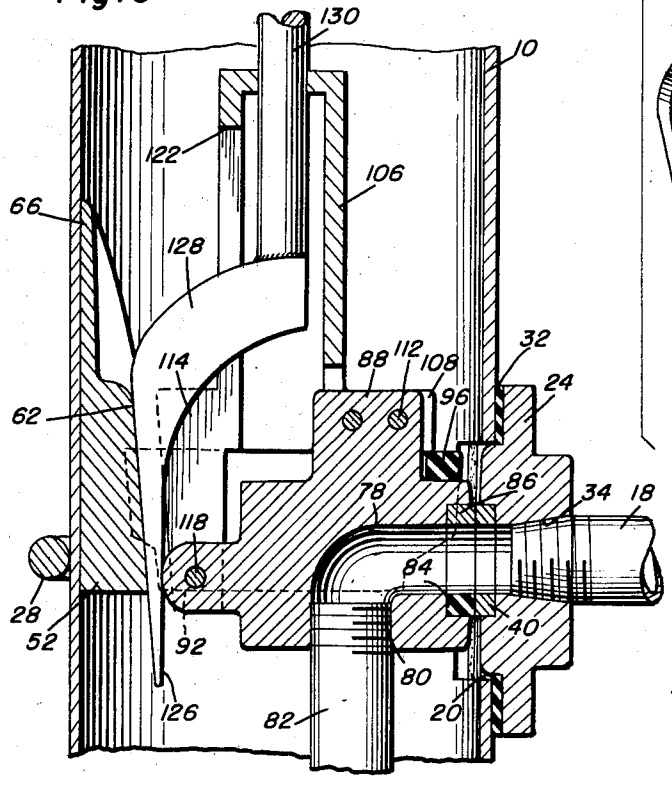


Fig. 6



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2,903,067

Patented Sept. 8, 1959

2,903,067

ADAPTER FOR DROP PIPE IN DRILLED WELL CASINGS

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Application August 30, 1955, Serial No. 531,533

10 Claims. (Cl. 166—85)

This invention generally relates to novel and useful improvements in an adapter for supporting a drop pipe in coupled relation to a service pipe in a drilled well casing to permit the removal of the drop pipe and substantially all of the adapter from the upper end of the casing and leaving the interior of the casing smooth for the purposes of cleaning the well by pumping the contents thereof upwardly and out of the well.

In drilled well construction, it is normal for a service pipe to extend from the well casing to the interior of the building being serviced by the water at a point below the normal frost line. Extending downwardly from this point in the well casing is a drop pipe which is connected to the service pipe by a suitable L-coupling. When it is necessary to remove the drop pipe for purposes of cleaning, repair of the foot valve, pump or the like, it becomes necessary in present installation to excavate the soil surrounding the casing to a point below the frost line to provide access to the service line to permit the drop pipe to be disconnected therefrom. In disconnecting the service pipe, suitable tools are necessarily inserted into the interior of the casing and this sometimes results in loss of the tools into the casing to an inaccessible position to the bottom thereof and also necessitates the expenditure of a great deal of effort to uncover the service pipe. Also, the entry of the service pipe into the well casing provides an unsanitary condition since some surface water tends to seep through the opening in the casing into the water in the well casing. In solving this problem, certain areas utilize access pits for permitting the service line to be easily disconnected. However, these are not successful in certain areas and also increase the dangers of contamination of water in the well by seepage of surface water. Accordingly, it is the primary object of the present invention to provide an adapter for connecting the drop pipe to the service pipe and yet permitting easy removal of the drop pipe from the upper end of the casing by the use of no loose tools whatsoever thereby assuring that no tools will be accidentally dropped into the well casing and affording a completely smooth and continuous inner surface in the well casing when the adapter has been removed thereby permitting cleaning of the well in a most expeditious manner.

Another object of the present invention is to provide a device as set forth in the preceding object including means for sealing the service pipe in relation to the casing and means for sealing the drop pipe in relation to the service pipe for providing fluid communication therebetween together with wedge means for retaining the drop pipe in sealed relation to the service pipe wherein an impact member is provided for actuation from the top of the well casing for assembling the device and also for disassembling the device wherein the entire apparatus may be removed by a suitable lift means from the upper end of the casing thereby eliminating the use of any tools whatsoever within the interior of the casing.

Another important object of the present invention is to provide a removable sealing gasket between the service pipe adapter and the body to which the drop pipe is supported thereby permitting renewal of the sealing gasket when the adapter is removed thereby assuring proper sealing relation thereof after each removal of the adapter.

Other objects of the present invention will reside in the simplicity of construction, ease of assembly and disassembly, dependability, sanitary construction, adaptation for its particular purposes and its relatively inexpensive manufacturing cost.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

Figure 1 is an elevational view of the adapter of the present invention showing the device installed in a well casing and the relationship to the service pipe and drop pipe wherein certain portions are broken away and taken in section for illustrating the details thereof;

Figure 2 is a sectional view taken substantially upon the plane passing along section line 2—2 of Figure 1 illustrating the construction of the adapter collar fitting around the exterior of the well casing together with the electrical adapter associated therewith;

Figure 3 is a detailed sectional view taken substantially upon a plane passing along section line 3—3 of Figure 2 illustrating the sealing bushing for permitting passage of the electrical conductor through the adapter collar;

Figure 4 is a perspective view of the split arcuate ring-like member having the projecting end portions and the upstanding longitudinal wall illustrating the means of attaching the flexible chains thereto;

Figure 5 is a transverse, vertical sectional view taken substantially upon a plane passing along section line 5—5 of Figure 1 illustrating the relationship of the body to the upstanding wall of the arcuate ring-like member together with the relationship of the projecting ends of the ring-like member and the collar;

Figure 6 is a longitudinal, sectional view taken substantially upon a plane passing along section line 6—6 of Figure 5 illustrating the specific structural details of the body together with the relationship of the wedge member; and

Figure 7 is an exploded group perspective view illustrating the operating details of the wedge member and the body member actuated thereby.

Referring now specifically to the drawings, the cylindrical well casing is designated by the numeral 10 and is inserted into the ground surface 12 during the well drilling operation and is provided with a closure cap 14 secured in position by setscrews 16. When the casing 10 is installed during the well drilling operation, the ground 12 must be dug to a point below the frost line for the installation of a service pipe 18 which is installed in alignment with an enlarged arcuate opening 20 in the well casing 10. During the period of installation of the service pipe 18, an electrical conduit 22 may be installed where a submersible type pump is going to be used. However, if the pump is installed within the basement of the house or other suitable area, the electrical conduit 22 is unnecessary.

A generally U-shaped collar 24 is disposed in overlying relation to the enlarged opening 20 in the casing 10 and is provided with a pair of outwardly projecting cylindrical sleeves 26 for receiving the leg portions of enlarged U-bolt 28 which has threaded ends projecting through the sleeves 26 together with nuts 30 thereon for rigidly clamping the collar 24 to the casing 10. The collar 24 is provided with a sealing gasket 32 disposed between the casing 10 and the collar 24 thereby sealing the collar 24 to the casing 10. The service pipe 18 is

screw-threadedly engaged into a generally frusto-conical passage 34 in the collar 24 thereby forming an effective seal and connection between the service pipe 18 and the collar 24. The outer end of the passage 34 is defined by a cylindrical boss 36 and the inner end of the passage 34 terminates in a recessed portion 38 receiving a hard annular ring member 40 which faces inwardly of the collar 24 and presents itself toward the interior of the casing 10 through the opening 20 wherein the annular member 40 provides a flat surface for the inner end of the passageway 34 extending through the collar 24.

As illustrated in Figures 2 and 3, the collar 24 may be provided with an outwardly extending boss 42 receiving the electrical conductor 22 together with a screw-threaded bushing 44 for sealing the electrical conductor 22 in relation to the boss 42 which defines a passage 46 through the collar 24 and a passage 48 through the well casing 10. It will be noted that the gasket 32 also surrounds the opening 48 in the casing 10 thereby assuring a proper seal between the collar 24 and the well casing 10.

As illustrated in Figure 5, the collar 24 is provided with a pair of inwardly extending notches or sockets 50 which face inwardly through the opening 20 in the casing 10. A generally split arcuate ring-like member 52 having an opening at one side thereof designated by the numeral 54 wherein the ends formed by the opening 54 project laterally outwardly and are designated by the numeral 56 wherein the ends of the projections 56 are rounded as designated by the numeral 58 for insertion into the sockets 50. The member 52 is substantially equal in outside diameter to the inside diameter of the well casing 10 and is provided with an upstanding arcuate longitudinal plate 60 on the upper surface thereof in diametric opposition to the projecting ends 56. The central lower portion of the longitudnial extension plate 60 is provided with an inwardly extending lug 62 presenting side walls 64 wherein the lug 62 is generally provided with an inclined surface facing the center of the annular ring 52 for a purpose described hereinafter. The upper edge of the arcuate ring-like member 52 is inclined downwardly and inwardly as indicated by the numeral 66 and provided with a pair of upstanding lugs 68 for attachment to a pair of flexible chains 72 which are terminally secured at the upper ends to an eye member 74 on the inner surface of the closure cap 14 for the well casing 10 wherein the flexible chains 72 are normally in slack condition when the member 52 is mounted within the casing 10.

In installing the member 52, the flexible chains 72 are grasped and the member 52 is disposed in inclined relation and lowered downwardly into the casing 10 until such time as the projecting ends 56 which are extending downwardly, move into alignment with the sockets 50 in the collar 24 wherein the arcuate ring-like member 52 may then assume a horizontal position with the arcuate plate 60 engaging the inner surface of the well casing 10 in opposition to the collar 24 and preventing movement of the member 52 beyond a horizontal position wherein the member 52 will be retained in the manner illustrated in Figure 1.

A body 76 of generally rectangular construction is provided with a right angular passage 78 therein with the vertical portion thereof being provided with a screw-threaded connection 80 with a drop pipe 82 which extends downwardly into the well casing 10 for insertion into the water for pumping the water upwardly in the usual manner. The horizontal portion of the passage 78 is adapted for disposition in alignment with the passage 34 and the collar 24 and is provided with a recess 84 into which is inserted a removable sealing gasket 86 which is adapted to contact the hardend annular disk 40 in the collar 24 for assuring a seal between the body 76 and the collar 24 thereby providing a sealed fluid communication between the service pipe 18 and the drop pipe 82. The body 76 is provided with an upstanding lug 88 on the upper end thereof having a pair of apertures 90 therein and the body 76 is also provided with a rearwardly extending lug 92 on the rear surface thereof with a transverse aperture 94 therein. Disposed in surrounding relation to the body 76 is a housing 96 of generally hollow construction provided with a slot 98 in the upper end thereof for receiving the upwardly extending lug 88 on the body 76. The housing 96 is provided with projecting legs 100 having inclined notched lower corners 102 for seating engagement against the upper surface 66 of the arcuate ring-like member 52. The ends of the projecting legs 100 are spaced apart substantially equal to the distance between the side walls 64 of the lug 62 on the arcuate plate 60 for sliding engagement in bridging relation to the lug 62. The ends of the legs 100 are generally inclined as designated by the numeral 104 for generally conforming to the curvature of the inner surface of the arcuate plate 60 for accurately positioning the body 76 in alignment with the passage 34 and the collar 24. Rigidly attached to the body 76 is a generally vertically disposed hollow bracket 106 having forwardly projecting spaced lugs 108 with apertures 110 therein for alignment with the apertures 90 in the lug 88 for receiving fastening pins 112 thereby attaching the bracket 106 to the body 76. The rear corners of the bracket 106 are provided with a pair of depending leg members 114 provided with an aperture 116 in the lower end thereof for alignment with the aperture 94 in the lug 92 on the body 76 for receiving a fastening pin 118 thereby further securing the bracket 106 to the body 76. The rear surfaces of the legs 114 are inclined as designated by the numeral 120 and a vertically elongated slot 122 is provided in the rear surface of the bracket 106 which is in communication with the vertically disposed opening 124 on the upper end of the bracket 106. Disposed between the legs 114 is a wedge shaped member 126 of right angular configuration with the horizontal leg 128 being provided with an upstanding actuating rod 130 which is slidably received in the aperture 124 in the top of the bracket 106 wherein the slot 122 together with the legs 114 and the opening 124 form a guide for movement of the wedge shaped member 126. The vertical leg of the wedge shaped member 126 is disposed for engagement with the inner inclined surface of the lug 62 and the outer end of the lug 92 wherein vertical movement of the member 126 will move the body 76 towards and away from the collar 24.

The upper end of the rod 130 on the wedge shaped member 126 is provided with an enlargement designated by the numeral 132 which is slidably received in a tubular member 134 having an impact head 136 secured thereto wherein the enlarged head 132 is received within the tubular member 134. The upper end of the tubular member 134 is provided with an eye ring 138 which is disposed adjacent the cap 14 wherein the eye ring 138 may be manipulated by hand for wedging the wedge-shaped member 126 in position or by the use of a suitable lifting hook together with a winch or the like wherein the wedge-shaped member 126 may be raised vertically and the entire body 76, housing 96, bracket 106 and drop pipe 82 may be lifted from the well casing 10 after which the flexible chains 72 may be utilized for lifting the member 52 from the well casing 10 thereby leaving a smooth inner surface on the well casing 10. In the event a submersible type pump is employed, the electrical conductor 22 may be provided with a detachable connector 140 adjacent the cap 14 for detachment thereof after which the electrical conductor may be withdrawn from the well casing from a point within the house if desired.

It will be seen that the present invention is extremely easy to install when the well casing 10 is being installed or when the ground area 12 adjacent the well casing

10 has been excavated for access to the service pipe 18. After the device of the present invention has been installed, it is then unnecessary to have access to the service pipe 18 inasmuch as the entire adapter contained within the casing 10 may be removed from the upper end thereof with the use of no small tools whatsoever thereby permitting cleaning of the well casing 10 as desired.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention as claimed.

What is claimed as new is as follows:

1. An adapter for supporting a drop pipe in a well casing and coupling the pipe to a service pipe comprising a collar clamped to the well casing and having a passage therethrough for alignment with an opening in the casing and receiving one end of the service line, a split arcuate ring-like member having outwardly extending lateral ends for projecting through the opening in the casing into sockets in the collar for supporting the member in the casing, a body having a right angular passage therein with one end of the passage aligned with the passage in the collar and a drop pipe attached to the body at the other end of the passage, said body being supported on said member, housing means supporting the body on said member, wedge means slidably mounted on said housing means and extending between the body and member for forcing the body towards the collar for urging the body and collar into sealing engagement, and wedge actuating means extending to the upper end of the casing for raising the body and member from the casing thereby removing the drop pipe thereby leaving the inner surface of the casing free of obstructions.

2. An adapter for supporting a drop pipe in a well casing and coupling the pipe to a service pipe comprising a collar clamped to the well casing and having a passage therethrough for alignment with an opening in the casing and receiving one end of the service line, a split arcuate ring-like member having outwardly extending lateral ends for projecting through the opening in the casing into sockets in the collar for supporting the member in the casing, a body having a right angular passage therein with one end of the passage aligned with the passage in the collar and a drop pipe attached to the body at the other end of the passage, said body being supported on said member, means for forcing the body towards the collar for urging the body and collar into sealing engagement, said means being actuated from the upper end of the casing and extending to the upper end of the casing for raising the body and member from the casing thereby removing the drop pipe, a seal disposed between the collar and casing in surrounding relation to the opening in the casing, a sealing gasket on said body for engaging the end of the passage in the collar thereby forming a water-tight passage and a water-tight seal around the opening in the casing.

3. An adapter for supporting a drop pipe in a well casing and coupling the pipe to a service pipe comprising a collar clamped to the well casing and having a passage therethrough for alignment with an opening in the casing and receiving one end of the service line, a split arcuate ring-like member having outwardly extending lateral ends for projecting through the opening in the casing into supported engagement with the collar for supporting the member in the casing, a body having a right angular passage therein with one end of the passage aligned with the passage in the collar and a drop pipe attached to the body at the other end of the passage, said body being supported on said member, means for forcing the body towards the collar for urging the body and collar into sealing engagement, said means being actuated from the upper end of the casing and extending to the upper end of the casing for raising the body and member from the casing thereby removing the drop pipe, said means for urging the body towards the collar including a vertically movable wedge disposed between the member and the body, an elongated member extending upwardly from the wedge, and an impact member captively slidably mounted on said elongated member, said wedge being mounted on said body and said impact member terminating in an eye member for engagement by a lift hook for loosening the wedge and raising the body.

4. An adapter for supporting a drop pipe in a well casing having a removable cap on the upper end thereof and coupling the pipe to a service pipe comprising a collar clamped to the well casing and having a passage therethrough for alignment with an opening in the casing and receiving one end of the service line, a split arcuate ring-like member having outwardly extending lateral ends for projecting through the opening in the casing into supported engagement with the collar for supporting the member in the casing, a body having a right angular passage therein with one end of the passage aligned with the passage in the collar and a drop pipe attached to the body at the other end of the passage, said body being supported on said member, means for forcing the body towards the collar for urging the body and collar into sealing engagement, said means being actuated from the upper end of the casing and extending to the upper end of the casing for raising the body and member from the casing thereby removing the drop pipe, said member having a pair of upwardly extending flexible members attached thereto, said flexible members being terminally secured to the well casing cap.

5. An adapter for removably supporting a drop pipe in a well casing and communicating the drop pipe with a service pipe connected with an opening in the casing comprising a member mounted within the casing, a housing movably supported on said member and supporting the drop pipe, said housing having a passage adapted to communicate the drop pipe with the service pipe, seal means at one end of the passage for engagement with the opening in the casing thereby providing a fluid tight passageway from the service pipe to the passage in the housing, means independently movable between the housing and said member for urging the housing towards the service pipe.

6. The combination of claim 5 wherein said means movable between the housing and said member includes a wedge-shaped member, and extension means on said wedge-shaped member terminating adjacent the upper end of the well casing for permitting actuation thereof from the upper end of the casing, and means interconnecting the wedge-shaped member and the housing for permitting removal of the housing simultaneuosly with the wedge-shaped member.

7. In a well casing having a peripheral wall with an opening therein with the opening being spaced below the upper end of the wall, a service pipe extending laterally from said casing and communicating with the interior of the casing, a drop pipe disposed vertically in said casing; that improvement comprising an adapter removably supporting the drop pipe in the casing and communicating the drop pipe with the service pipe with the entire adapter and drop pipe being removable from the upper end of the casing thereby leaving the interior thereof free of obstructions, said adapter including a ring-like member having lateral projection means on one side thereof for supporting engagement with the opening in the casing and an upstanding plate in opposition to the lateral projection means for supporting engagement with the interior surface of the casing, means attached to said ring-like member adjacent the plate for raising and low-

ering the ring-like member, a housing removably seated on said ring-like member, a body laterally movably mounted on said housing, said body having a passageway therein with the drop pipe connected to the body in communication with one end of the passageway, the other end of the passageway in the body facing the opening in the casing for communicating the passageway with the service pipe when the body is urged towards the opening in the casing, a vertically movable wedge member slidably mounted on said housing and extending between the body and the ring-like member remote from the opening in the casing for forcing the body laterally in relation to the opening in the casing when the wedge member is moved downwardly, means connected to said housing for actuating said wedge member and including an elongated member terminating adjacent the upper end of the casing forming a lifting eye for retracting the wedge member and lifting the housing, body and drop pipe out of the well casing.

8. The combination of claim 7 wherein a collar is provided for sealingly connecting the service pipe to the casing, said collar extending into the opening and terminating outwardly of the inner surface of the casing, said collar including a pair of spaced sockets facing the interior of the casing, said projection means on the ring-like member including a pair of spaced parallel projections having rounded ends for insertion into the sockets, the portion of the ring-like member between the projections being open and permitting lateral movement of the body in relation to the collar for engagement therewith, said body having a replaceable seal encircling the end of the passageway thereby sealing the body and collar and sealingly communicating the drop pipe with the service pipe.

9. The combination of claim 8 wherein said elongated member is constructed of telescopic sections with the lower section rigid with the wedge member and the upper section having a weight attached thereto and forming an impact member for moving said wedge member vertically.

10. An adapter for supporting a drop pipe in a well casing having a removable cap on the upper end thereof and coupling the pipe to a service pipe comprising a collar clamped to the well casing and having a passage therethrough for alignment with an opening in the casing and receiving one end of the service line, a split arcuate ring-like member having outwardly extending lateral ends for projecting through the opening in the casing into supported engagement with the collar for supporting the member in the casing, a body having a right angular passage therein with one end of the passage aligned with the passage in the collar and a drop pipe attached to the body at the other end of the passage, said body being supported on said member, said collar having a pair of sockets for receiving the ends of said member, a sealing gasket on said body for engaging the end of the passage in the collar thereby forming a watertight passage, a vertically movable wedge disposed between the member and the body, an elongated member extending upwardly from the wedge, and an impact member captively slidably mounted on said elongated member for urging the body towards the collar, said wedge being slidably mounted on said body and said impact member terminating in an eye member for engagement by a lift hook for loosening the wedge and raising the body and drop pipe, said ring-like member having a pair of upwardly extending flexible members attached thereto, said flexible members being terminally secured to the well casing cap for removing said ring-like member thereby removing the entire adapter from the casing.

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