

June 2, 1959

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 DEVICE FOR CONNECTING DRILL STEELS WITH
 A SOURCE OF FLUID UNDER PRESSURE

2,889,157

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2 Sheets-Sheet 1

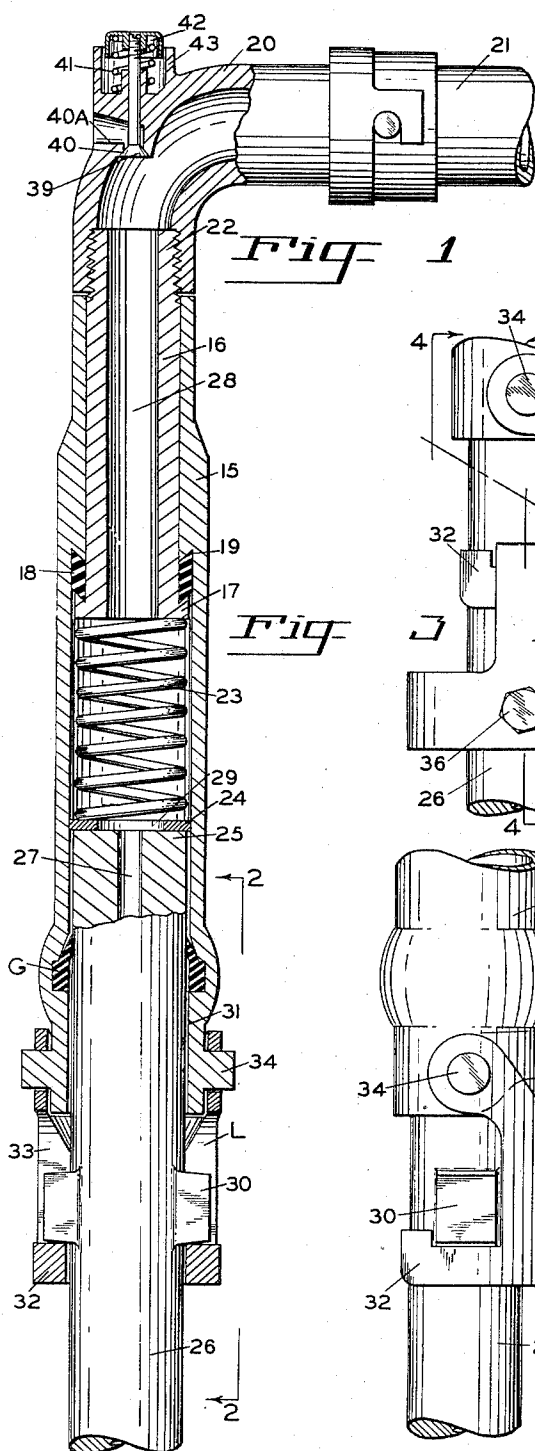


Fig. 1

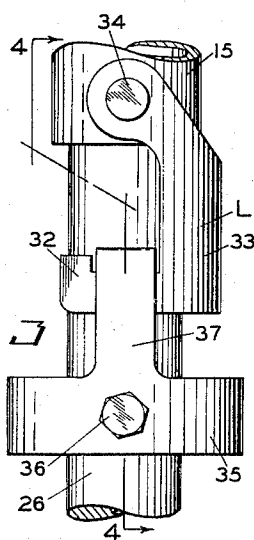


Fig. 3

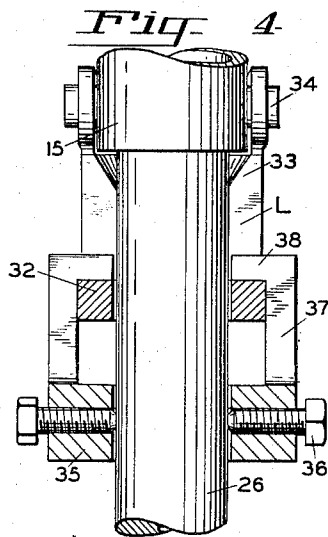


Fig. 4

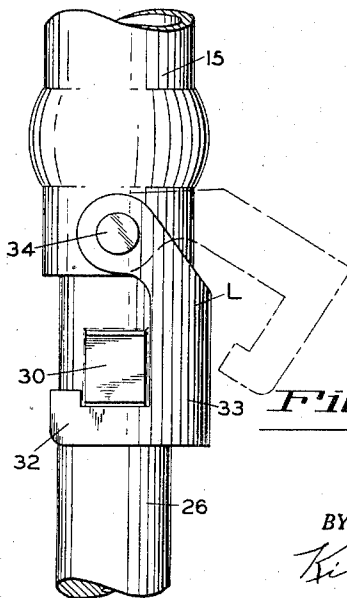


Fig. 2

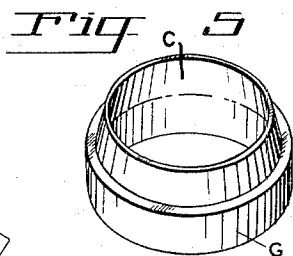


Fig. 5

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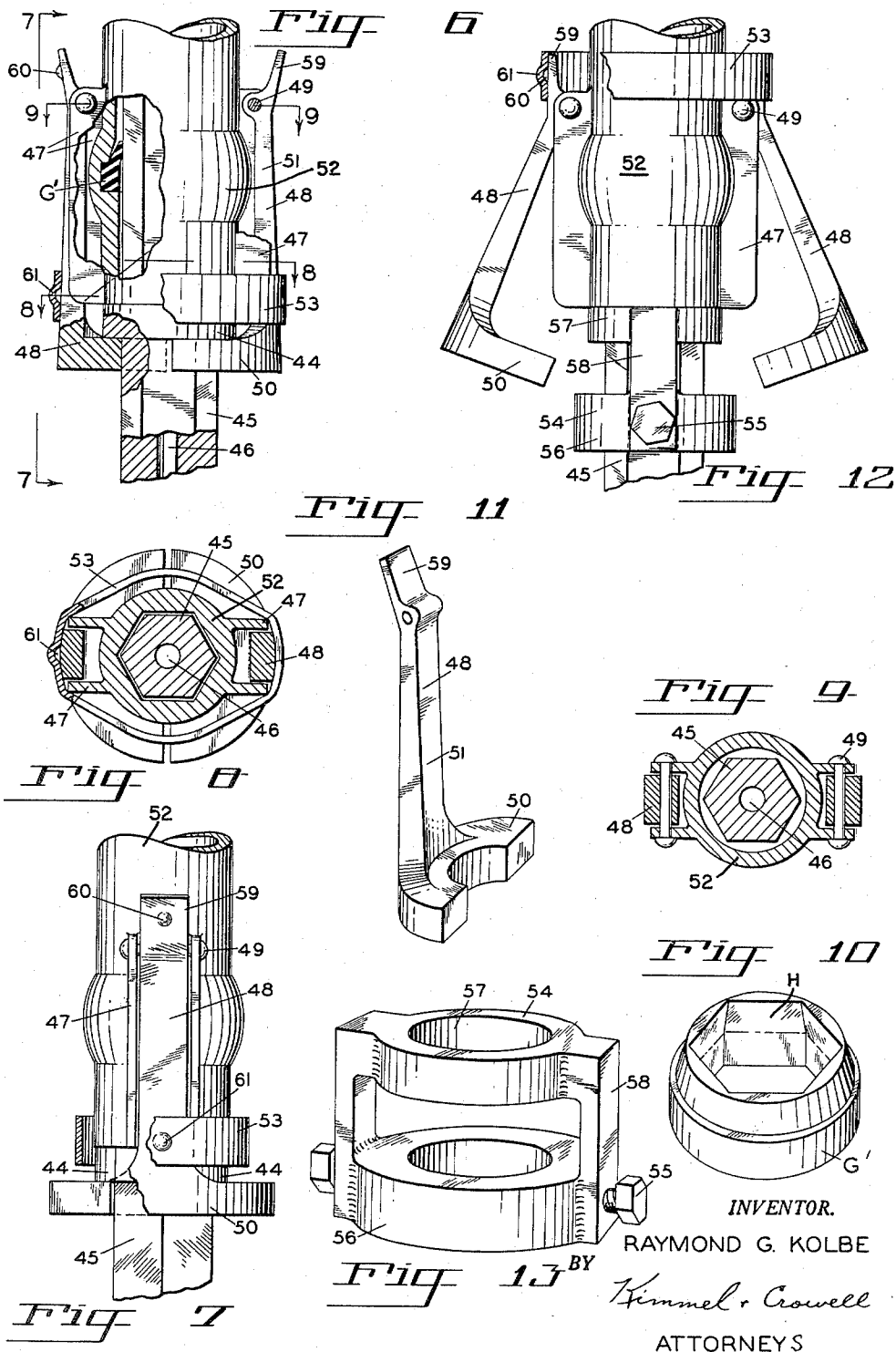
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DEVICE FOR CONNECTING DRILL STEELS WITH A SOURCE OF FLUID UNDER PRESSURE

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5 Claims. (Cl. 285—81)

This invention relates to an attachment for drill steels having an axial passage extending therethrough, and more specifically, the invention pertains to means for connecting the drill steel with a source of fluid under pressure.

One of the primary objects of this invention is to provide an attachment for connecting a drill steel with a source of fluid under pressure including means for connecting the attachment with the steel.

To persons skilled in this art, it is well known that many difficulties have been encountered in removing the drill steel from a drill hole because of the fact that loose rock tends to wedge around the bit, or clay collars form which choke the movement of the drill steel to bring about a freezing of the drill steel in the drill hole making it most difficult to remove the same therefrom. Thus, it is another object of this invention to provide new and improved means for supplying a fluid under pressure to the foreign matter surrounding the bit of the drill steel so that the same is flushed away therefrom to permit the easy removal of the bit from the hole.

It is still another object of this invention to provide an attachment of the type generally described supra, which is inexpensive to manufacture, non-complex to construct and assemble, and durable in use.

Other and further objects and advantages of the present invention will become more evident from a consideration of the following specification when read in conjunction with the annexed drawings, in which:

Figure 1 is a vertical cross-sectional view, partly broken away and partly in section, illustrating the attachment constructed in accordance with this invention, mounted on the upper end of a drill steel.

Figure 2 is a side elevational view of the means employed for locking the attachment to the drill steel, the view being taken on the vertical plane of line 2—2 of Figure 1, looking in the direction of the arrows.

Figure 3 illustrates a modification of the locking means which may be employed in connecting the attachment to the upper end of the drill steel when the shank portion thereof including the lugs have been broken or sheared off.

Figure 4 is a side elevational view, partly in section, of the locking means illustrated in Figure 3, the view being taken on the line 4—4 of Figure 3, looking in the direction of the arrows.

Figure 5 is a perspective view of one of the sealing gaskets employed in the attachment illustrated in Figure 1.

Figure 6 is a side elevational view of another form of the attachment, parts thereof being broken away for convenience of illustration, and showing the attachment as being connected with a drill steel having a substantially hexagonal configuration.

Figure 7 is a side elevational view of the device shown in Figure 6, the illustration being taken on the vertical plane of line 7—7 of Figure 6, looking in the direction of the arrows.

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Figure 8 is a cross-sectional view taken on the line 8—8 of Figure 6, looking in the direction of the arrows.

Figure 9 is a cross-sectional view taken on the horizontal plane of line 9—9 of Figure 6, looking in the direction of the arrows.

Figure 10 is a perspective view of one of the gaskets utilized in the modification illustrated in Figure 6.

Figure 11 is a perspective view of one of the locking latches employed in the modification illustrated in Figure 6.

Figure 12 illustrates means for connecting the attachment in Figure 6 to a drill steel which has been broken off below its shank.

Figure 13 is a perspective view of the adaptor means illustrated in Figure 12.

Referring now more specifically to the drawings, the attachment or hose connector constructed in accordance with the present invention comprises an elongated tubular body 15 having a tube 16 telescoped and swivelly mounted within the upper end thereof. The tube is provided with an enlarged head 17 at its inner end which is engaged against one end of a sealing gasket 18, the latter being seated within a pocket 19 internally formed in the body 15. The upper end of the tube 16 projects beyond the adjacent end of the tubular body 15 and is provided with external threads 22 which are engaged by internally formed threads on one end of pipe fitting 20. Conventional coupling means connect the other end of the pipe fitting 20 with one end of a hose 21, the other end of which is connected with a source of fluid under pressure such as, for example, air or water.

The upper end of a coil spring 23 is welded or otherwise secured to the lower end of the tube 16, and the other end of the spring 23 is similarly fixedly secured to an annular washer 24 which, in turn, is arranged to engage the upper end of the drill steel. By securing the washer 24 to the other end of the spring 23, a free working action is obtained between the spring 23 and the top of the drill steel 26 when the body 15 is revolved.

In the conventional manner, the drill steel 26 including the bit thereof, is provided with a longitudinally extending axial passageway 27 which registers with the opening or passageway 28 formed in the tube 16, communication therewith being afforded by means of the aperture 29 formed in the washer 24. Thus, a continuous passage is provided between the drill steel 26 and the source of fluid under pressure.

Under actual working conditions and in cases wherein the shank of the drill steel 26 has not been broken and the lugs 30 thereof are available, the upper end 25 of the drill steel 26 is inserted through the bore 31 of the body 15 coming to rest against the washer 24, and in so doing compresses the spring 23 to force the head 17 of the tube 16 tightly against the sealing gasket 18. After the drill steel 26 has been inserted within the body 15 a sufficient distance, the double hook 32 engages under the lugs 30 in the manner illustrated in Figures 1 and 2. The hooks 32 are integrally formed on a body member 33 pivotally mounted on the outwardly extending studs 34 which are integrally formed with the body 15 of the hose connector.

In many instances the shank of the drill steel 26 has been broken off below the lugs 30 in which case a special adaptor 35 as seen in Figures 3 and 4 is slipped over the top of the drill steel 26 and locked thereon by means of the set screws 36. The adaptor 35 is provided with a pair of oppositely disposed integrally formed and upwardly extending hanger arms 37, the upper ends of which terminate in inwardly turned fingers 38 which engage the hooks 32 of the latch L, in the manner illustrated in Figures 3 and 4.

The pipe fitting 20 is provided with a finger actuated pressure relief valve 39 employed to release the pressure within the pipe fitting 20 when it is disconnected from the drill steel 26. As is seen in Figure 1 of the drawings, the valve 39 has a push button 42 fixedly secured to the upper end thereof and arranged to reciprocate within a hollow boss 43 integrally formed with the pipe fitting 20. A coil spring 41 is disposed within the boss 43 engaging the underside of the push button 42 and the confronting end of the boss 43. Thus, the spring 41 constantly biases the valve 39 towards its normally closed position to engage against the valve seat 40 and close the discharge passage or vent 40A.

Figures 6 to 12, inclusive, refer to an attachment or connector which is adapted, especially, for use in connection with drill steels having a hexagonal configuration. Drill steels 45 of hexagonal configuration are conventionally provided with a collar 44 in lieu of the lugs 30 normally found on the cylindrical type of drill steels 26, and therefore, a different type of locking mechanism is required for connecting the hose attachment to the drill steel 45, it being understood, however, that the present embodiment of this invention is not in any way or manner limiting in the scope of the use of the attachment in connection with drill steels having other configurations.

The hexagonal drill steel 45 is provided with the usual longitudinally extending axial passageway 46 therethrough. An elongated tubular body 52 is provided with oppositely disposed pairs of reinforcing ribs 47 integrally formed with the lower end thereof. The ribs 47 have pivotally mounted therebetween a pair of latches 48 supported on cross pins 49. The lower ends of the latches 48 are bifurcated at 50 at right angles relative thereto. As seen in Figure 8, the latches 48 have the body portion 51 thereof extending below the ribs 47. The ribs 47 serve additional functions in providing guard means for the latches 48 and also in providing reinforcement to the body 52 of the connector.

When desired, the latches 48 may be held in their locked position, as shown in Figures 6, 7 and 8, by means of a retaining ring 53 slipped downwardly thereover. In such occasions in which the shank of the drill steel 45 has been broken off below the collar 44, the adaptor 54 is applied and locked thereto by means of set screws 55. The adaptor 54 comprises a ring 56 which embraces the drill steel 45 and supports in elevated position a second ring 57 by means of the diametrically opposed connecting arms 58. The ring 57 takes the place of the collar 44 and receives thereunder the lower bifurcated ends 50 of the latches 48.

Figure 12 of the drawings shows the adaptor 54 and the attachment in their respective relative positions for removing or connecting the connector from the drill steel 45. As shown therein the latches 48 have extended portions 59 at the upper ends thereof to serve a function to be described.

A detent 60 is formed on one of the extended portions 59 of the latches 48, for engagement in a socket 61 formed on the inner side of the locking ring 53, reference being made particularly to Figure 12 of the drawings. When this ring 53 is elevated from the position shown in Figure 6 to that shown in Figure 7, the detent 60 seats within the socket 61 to retain the ring 53 in this elevated position. Under these conditions, the bifurcated ends 50 of the latches 48 are caused to extend laterally outwardly from their normal engaging position under the collar 44, or the ring 57, thereby permitting the drill steel 45 to be placed in the hose connector or removed therefrom.

The operation of the hose connector attachment as described and illustrated herein is relatively non-complex. Referring now to Figures 1 and 2, the upper end 25 of the drill steel 26 is inserted through the opening 31 of

the lower end of the body 15 of the connector and passes up through the sealing gasket G to engage against the washer 24. Further movement effects a compression of the spring 23 to establish a seal between the gasket 18, the tube 16, and the body 15 of the hose connector or attachment.

The sealing gasket G has a cylindrical bore C and is removable from the connector. However, when the drill steel 45 has a hexagonal configuration, the gasket G' constructed with a hexagonal inner bore H, as shown in Figure 10 is used therewith.

After the drill steel 26 has been inserted a sufficient distance into the connector so that the lugs 30 may clear the double hook 32, the latter is brought to the position shown in full lines in Figure 2, after which the force of the compression of spring 23 will hold the lugs 30 securely against the hooks 32. Fluid under pressure is then introduced to the hose 21, the fluid comprising either air or water, and the fluid is forced through the opening 28 of the tube 16 through the washer 24 and the axially extending opening 27 of the drill steel 26 for eventual discharge at the bit end thereof. The fluid cleanses all foreign material away from the bit to permit the easy removal thereof from the drill hole.

In many drilling operations a reciprocating air hammer is used to force a drill steel, such as that disclosed at 26 or 45, into rock or other hard substance by a relatively prolonged vibrator pounding which disintegrates the rock below the drill point to permit the drill to advance into the rock. Most drills of this nature are hollow and a fluid material, such as water, air, or drilling mud, is pumped down the hollow core of the drill moving upwardly within the drill hole along side of the drill to carry away the disintegrated rock material.

In removing such drills from the well, particularly when struck, the hammer is removed from the drill and the invention described above connected thereto to permit fluid material to be passed through the drill and up out of the drill hole along side of the drill to remove the packed obstruction locking the drill in the hole. The instant invention not only connects a source of fluid pressure to the drill but also provides a lifting bail by which the drill may be lifted from the wall as it is loosened by the fluid flow.

No drilling takes place while the present invention is attached to the drill. In drilling relatively deep holes, drill steels of progressively longer lengths are successively used in the operation. The instant invention is useful for lifting the drill steel from the hole while simultaneously cleaning the cuttings from the hole when such changes of length are being accomplished.

In some drilling operations, clay and other earthy materials are encountered which tend to block the central hole in the drill as the drill is being lowered into the well. With the instant invention such blocking or plugging of the central bore can be eliminated producing a considerable savings in time in removing the drill steel from the well as would otherwise be required.

It is to be understood that the embodiments of the invention herein described and illustrated are offered merely by way of example, and that the invention is to be limited only by the scope of the following claims.

What is claimed is:

1. A connector for drill steels of the type having outwardly projecting connecting means fixedly secured thereto adjacent one end thereof comprising, an elongated hollow tubular body, a tube mounted in said body for axial sliding movement, a radially outwardly extending head formed on one end of said tube with the other end of said tube projecting axially from one end of said body, a radially inwardly projecting shoulder formed in said body in opposed relation to said head, a sealing gasket positioned in sealing engagement between said body and said tube and between said head and said shoulder, a coil spring having one end fixedly secured

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to said one end of said tube, a flat washer fixedly secured to the other end of said spring, said spring and said washer being positioned within said body, a latch pivotally secured to said body adjacent the other end thereof for engagement with said projecting connecting means with said drill steel extending into said body engaging against said washer compressing said spring whereby said spring biases said drill steel in a direction to effect tighter engagement between said latch and said projecting connecting means.

2. A device as claimed in claim 1 wherein said body is provided with an internal annular gasket seat adjacent the other end of said body and a sealing gasket mounted in said seat engaging said drill steel.

3. A device as claimed in claim 1 wherein said body is provided with a pair of oppositely disposed aligned studs adjacent the other end thereof, and said latch comprises a double hook pivotally mounted on said studs including a pair of substantially J-shaped hooks having stems disposed in spaced generally parallel relation and integrally secured together.

4. A device as claimed in claim 1 wherein said body is provided with diametrically opposed pairs of longitudinally extending spaced apart parallel ribs, and said latch comprises a body portion positioned between said parallel ribs of each pair, means pivotally securing said body portions to said ribs, radially inwardly extending integral means on the lower ends of said body portions for releasably engaging said projecting connecting means,

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an outwardly extending angular offset integrally formed on the upper end of each of said body portions above said pivotal securing means, and a ring vertically slidably mounted on said body portions whereby when in its lowest position to secure said latches in latching position and when in its upper position to engage said offsets to secure said latches in disengaged position.

5. A device as claimed in claim 1 wherein said projecting connecting means are fixedly secured to a collar, and means are provided on said collar for detachably securing said collar in fixed position on said drill steel.

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