

July 29, 1941.

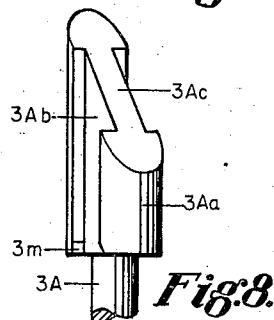
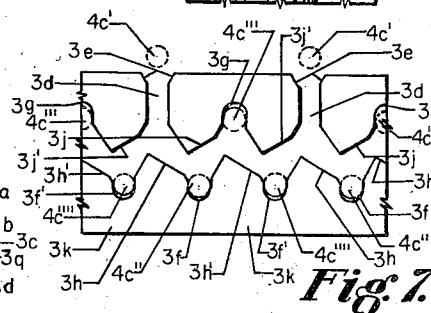
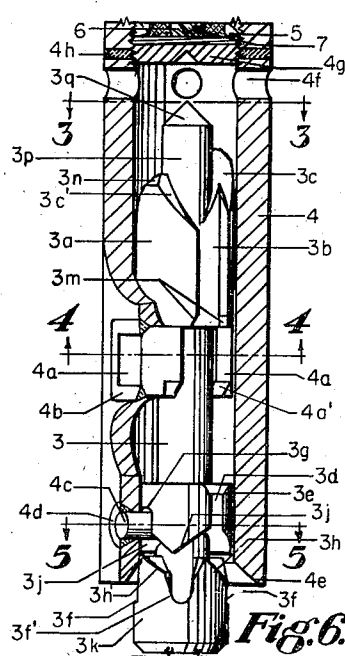
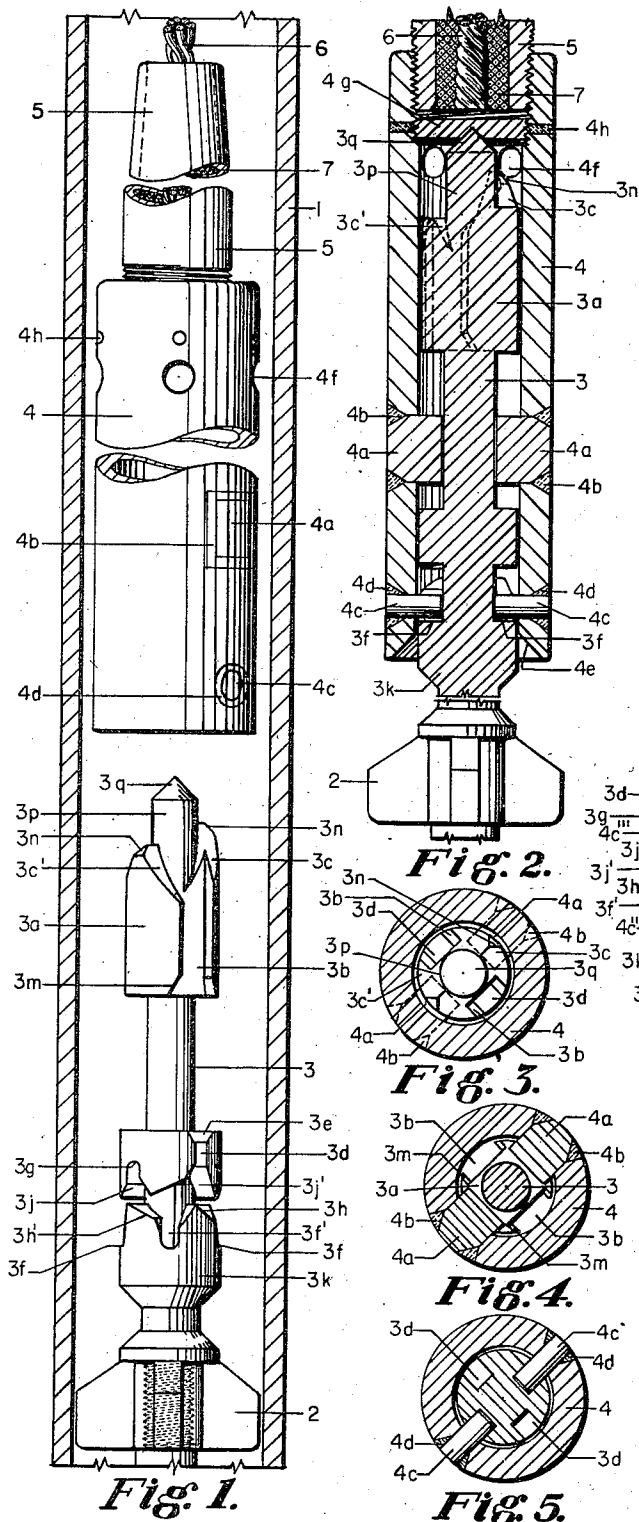
A. BOYNTON

2,250,463

CABLE PULL OVERSHOT

Filed Nov. 28, 1938

3 Sheets-Sheet 1



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CABLE PULL OVERSHOT

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3 Sheets-Sheet 2

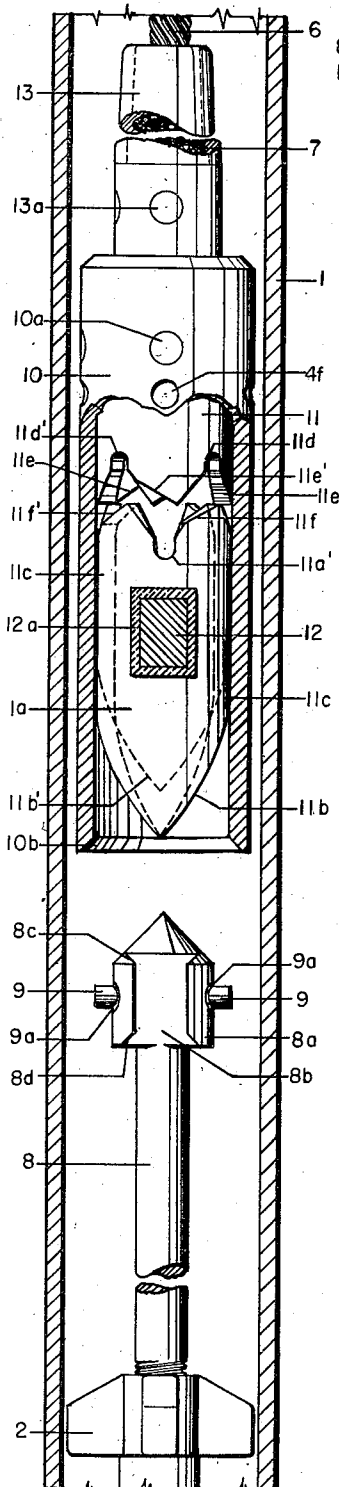
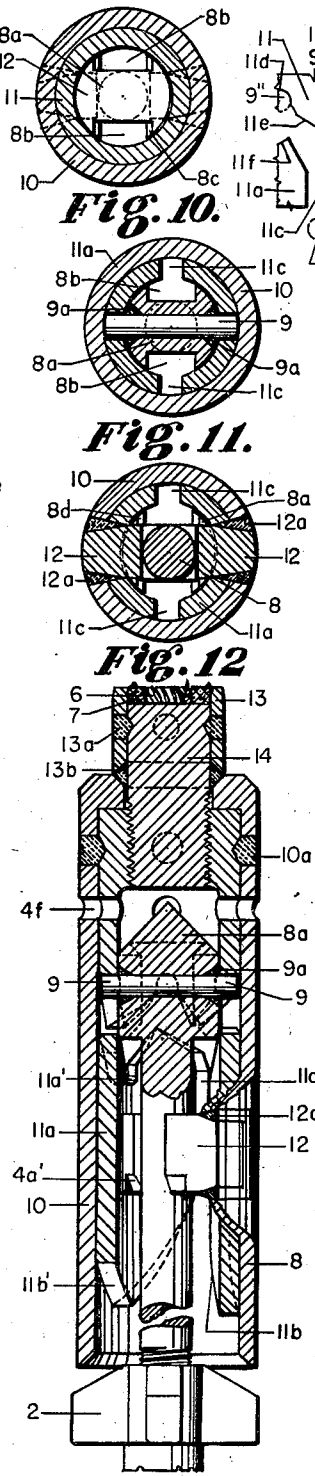


Fig. 9.



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3 Sheets-Sheet 3

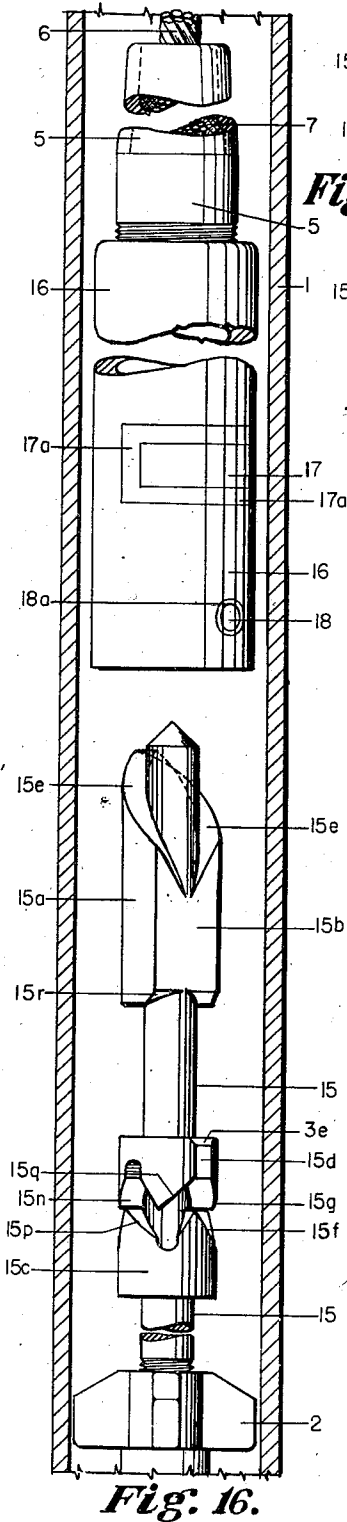


Fig. 17.

Fig. 18.

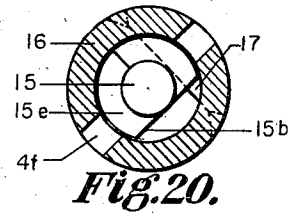
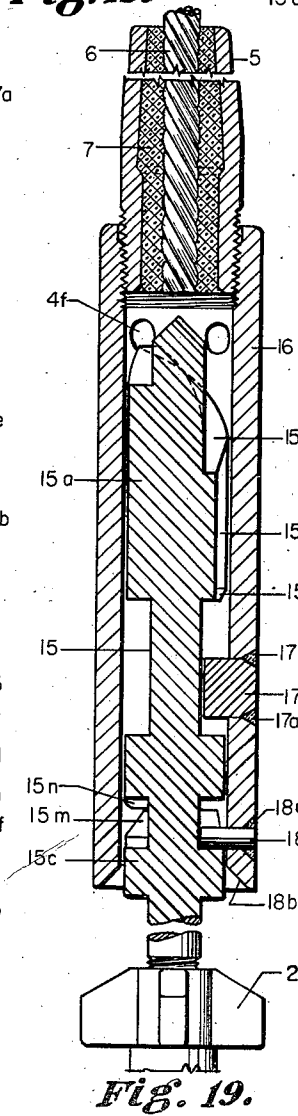


Fig. 20.

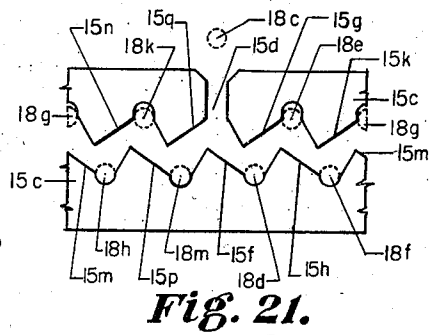


Fig. 21.

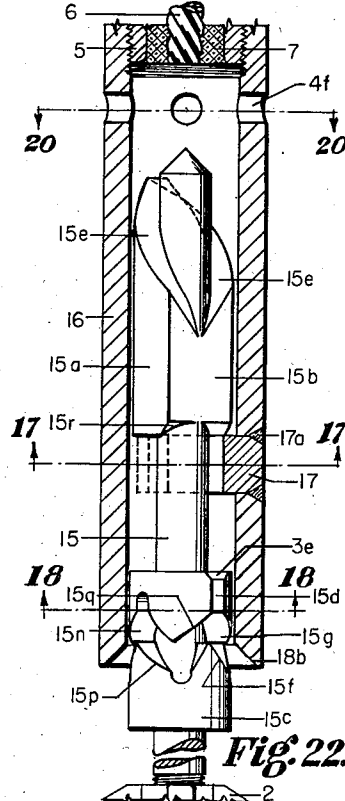


Fig. 22.

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UNITED STATES PATENT OFFICE

2,250,463

CABLE PULL OVERSHOT

Alexander Boynton, San Antonio, Tex.

Application November 28, 1938, Serial No. 242,779

13 Claims. (Cl. 287-103)

My invention relates generally to means for operating wire line well testing devices and of inserting and removing drill bits, core barrels, and other equipment adapted to be inserted and withdrawn through the drill pipe commonly employed in drilling wells by the rotary method.

Other uses for this tool will be to plant explosives in wells, release tools that sometimes hang or become stuck, recover recording instruments often left for a time in wells, and perform other useful services whenever a tool is needed to place anything in a well and leave it permanently or to place anything in a well, leave it for a time, by removing the cable or pipe by which it was lowered, and later recovering the thing so left. This invention is particularly adapted to be used in connection with construction disclosed in my prior Patent No. 2,217,043 of October 8, 1940, and my copending applications, Serial Nos. 233,238, filed October 4, 1938; and 233,239, filed October 4, 1938.

In operating wire line well testing devices, such for example as those referred to in the foregoing paragraphs it is necessary to lower a tool which will engage a connection to a piston and impart one or more pulls to the piston, thereupon releasing the piston, after which the tool is withdrawn from the well. For inserting, through the drill pipe, drill bits, core barrels, and other parts, it is necessary that the part being inserted be landed at bottom of the drill pipe and then released. This device may be employed for all of the above purposes, as will be more fully explained.

One or more horizontally positioned pins are employed to guide the male and female members of the device into engagement so that one or more lugs in the female member are positioned under the head of the male member at the time when the cable pull raises the piston or releases the bit, core barrel, or other part, as the case may be. Whether the device is in position to transmit a pull on the lower member or to turn the lower member loose when the cable is tightened depends upon the position of the lug or lugs and pin or pins with reference to the slots; and the position of the lugs and pins with reference to the slots is determined by the number of pins and number of changes in direction of the slots. If the male and female members are assembled when lowered into the drill pipe, the position of the pins in the slots at such time will determine whether the male and female members will remain engaged or become disengaged by the first or subsequent pulls on the cable after the device lands at a predetermined place in the drill pipe.

I attain the foregoing objects by mechanism illustrated in the accompanying drawings, in which:

Fig. 1 is an outside view of the preferred embodiment of the invention in the drill pipe, shown in vertical section, just before the male and female members of the device have become engaged or just after they have become disengaged.

Fig. 2 is a longitudinal section of the device, shown in Fig. 1, just as the upper assembly attached to a steel cable has landed upon a lower member which transmits the cable pull to the mechanism engaged thereby.

Fig. 3 is a transverse section on the line 3-3, Fig. 6.

Fig. 4 is a transverse section on the line 4-4, Fig. 6.

Fig. 5 is a transverse section on the line 5-5, Fig. 6.

Fig. 6 is a longitudinal view partly in section and partly in outside view of the device shown in Figs. 1 and 2, engaged to transmit the cable pull to the mechanism to be moved thereby.

Fig. 7 is a development showing the slots in the actuator segment shown in Figs. 1, 2, and 6, the position of the actuator segment corresponding to its position in Figs. 1 and 6.

Fig. 8 is a side view of a modified form of a portion of the head and slot member, shown in Figs. 1, 2, and 6.

Fig. 9 is a similar view to that shown in Fig. 1, illustrating the first modified form of the invention.

Fig. 10 is a transverse section on the line 10-10, Fig. 15.

Fig. 11 is a transverse section on the line 11-11, Fig. 15.

Fig. 12 is a transverse section on the line 12-12, Fig. 15.

Fig. 13 is a longitudinal section of the device shown in Fig. 9, just as the upper assembly attached to steel cable has landed upon the lower member which transmits the cable pull to the mechanism to be moved by the wire line.

Fig. 14 is a development showing the arrangement of the slots formed between the actuator shells shown in Figs. 9, 13, and 15, the position of the shell corresponding to its position in Fig. 9.

Fig. 15 is a longitudinal view, partly in section and partly in outside view of the device shown in Figs. 9 and 13, with parts in engagement so that a desired pull may be transmitted through the cable.

Fig. 16 is a similar view to that shown in Fig. 1

illustrating the second modified form of the invention.

Fig. 17 is a transverse section on line 17—17, Fig. 22.

Fig. 18 is a transverse section on line 18—18, Fig. 22.

Fig. 19 is a longitudinal section of the device shown in Fig. 16 with parts in engagement to transmit the cable pull after the cable is tightened.

Fig. 20 is a transverse section on line 20—20, Fig. 22.

Fig. 21 is a development showing the slots in actuator segment of Figs. 16, 19, and 22, the position of the segment corresponding to its position in Figs. 16 and 22.

Fig. 22 is a longitudinal view, partly in section and partly in outside view, of the device shown in Figs. 16 and 19, with parts in engagement so that a desired pull may be transmitted through the cable.

Similar reference characters refer to similar parts throughout the several views.

The discussion of the preferred embodiment of this invention will relate primarily to engaging the head 3a and administering one pull to the head, after which it will be released.

In the preferred form of the invention illustrated in Figs. 1 to 7, inclusive, the drill pipe 1 is assumed to be positioned in a well bore, the device within the drill pipe being shown disengaged. The finned guide 2 which supports the member 3 centrally of drill pipe 1, is assumed to be attached at its lower end to a piston, bit, core barrel, or other object (not shown) to be pulled upon and left in the well or to be withdrawn therefrom, to which the head 3a and the member 3 have connection.

The shell 4 is threadedly joined to socket 5 within which the cable 6 is secured by lead, solder or babbitt 7. The inner and outer surfaces of the cable socket 5 are tapered, the larger diameters being toward the lower end. The tapered outer surface is for the obvious purpose of minimizing the danger of engaging tool joints or other obstructions in the drill pipe while the device is being withdrawn. The inner tapered surface causes the lead, solder, or babbitt to more tightly engage the cable in case of any slippage between the babbitt and the nipple 5 during a strong pull upon the cable.

The opposing ends of the lugs 4a and of the pins 4c are positioned so as to allow between them free longitudinal movement of the part 3, as appears in Fig. 2. The lugs and pins, respectively, are preferably spaced 180° apart. The slots 3b, likewise spaced 180° apart, are of such width as will freely allow the lugs 4a to pass between them. The lugs are preferably somewhat wider than the diameter of the pins.

The lower pin pockets 3f and 3f' and the upper pin pockets 3g and slots 3d are all uniformly spaced 90° apart around the actuator segment 3k, as appears in Fig. 7. It also appears in Fig. 7 that the lower pockets are offset 45° with reference to the upper slots and pockets. If suitable machinery be available for broaching, it will be understood that the lugs 4a may be made integral with the shell 4.

In operation for the purpose of engaging the head 3a and exerting one pull upon it, and then releasing the head so that the cable and shell 4 can be withdrawn from the drill pipe, shell 4 is lowered into the drill pipe as shown in Fig. 1 and allowed to descend to the position shown in Fig.

2, openings 4f being to allow for the expulsion of mud when the shell descends over the head 3a. In changing position from that shown in Fig. 1 to that shown in Fig. 2, the pins 4c, secured in place within shell 4 by welds 4d, are guided into slots 3b by sloping surfaces 3c and 3c', the bevel 4e, Figs. 2 and 6, serving initially to align shell 4 and head 3a.

The lugs 4a secured within shell 4 by welds 4b are directly aligned with the pins, and follow the pins downward into and through slots 3b until pins 4c land within lower pockets 3f (see Fig. 7), which shows the actuator segment 3k developed or rolled out. The bevels 4a', Fig. 6, serve to help the pins guide the lugs into the slots 3b. The position of pins 4c just before they enter slots 3d is indicated at 4c', Fig. 7.

As shell 4 is lowered still further the pins 4c are guided into slots 3d by bevels 3e. As the pins move downwardly they engage the sloping surfaces 3h by which they are guided into lower pockets 3f where the pins are indicated at 4c''. The cable is now pulled upon raising the pins against the inclined surfaces 3j, by which the pins are guided into upper pockets 3g, as appears in Figs. 6 and 7, in which position of the parts lugs 4a are under and engaging with the unslotted portion of head 3a, as appears in Figs. 3, 4, and 6. Again referring to Fig. 7, the pins are shown in the latter position at 4c'''. In this position it will be observed that there is slight clearance between the pins and upper end of pockets 3g in order that the lugs 4a will engage under the head 3a without any pulling strain being absorbed by the pins; thus providing that all of the pulling strain will be upon the lugs. Manifestly, the upper pockets 3g can be substituted by open slots similar to the slots 3d without affecting the operation.

After the required force has been exerted by the lugs 4a under head 3a for the desired length of time, the cable is again slackened; whereupon shell 4 with pins 4c and lugs 4a move downward until the pins engage upon the sloping surfaces 3h' by which they are guided into lower pockets 3f' in which position the pins are indicated at 4c'''. To withdraw shell 4 from the drill pipe, the cable is again pulled upward, raising the pins against the sloping surfaces 3j' by which they are guided into the open slots 3d.

The plate 4g, secured in shell 4 by welds 4h, is so positioned that the rod-like upper extension 3p lands its tapered end 3q within a central depression in the lower side of this plate slightly before the pins 4c land upon the bottom of lower pockets 3f and 3f', as appears in Figs. 2 and 7. The previously stated clearance above the pins 4c in the uppermost engaged position of shell 4 and the here stated clearance under the pins in the lowermost position of that shell provide that the pins do not absorb any of the cable pull during the upstroke or any of the shock when shell 4 lands, except the comparatively small force required to deflect the shell by the pins contacting the upper and lower sloping surfaces which impart the rotary movement to the pins. For this reason it seems apparent that the pockets 3f and 3f' may be of any desired depth or if desired may be formed as open slots since the bottoms thereof have no function to perform.

It will be observed in Figs. 1 and 3 that the slots 3b and 3d have their centers aligned upon the member 3 and that the lugs 4a and pins 4c are similarly aligned within the shell 4. The upper wedge shaped surface 3c is somewhat above

the companion wedge shaped surface 3c' in order that the upper surface will guide the lower surface past the pins 4c without danger of these wedge shaped surfaces becoming impinged upon the pins, as might happen at times if the wedge shaped surfaces were at the same level. The bevels 3n and the upper rod-like extension 3p, having tapered end 3q, prevent the wedge shaped surfaces from impinging upon the lower end of shell 4 as the shell and head become engaged.

In order to provide that the pins will move in the direction above indicated, it will be observed in Fig. 7 that the lower inclined surfaces 3h underlie the slots 3d; that the upper inclined surfaces 3j overlie the lower pockets 3f; that the lower inclined surfaces 3h' underlie the upper pockets 3g; and that the upper inclined surfaces 3j' overlie the lower pockets 3f'.

By referring to Fig. 7, it will be noted also that each pin becomes disengaged from segment 3k through the slot by which the other pin entered this segment; that the pins have a close sliding fit within slots 3d in order to accurately guide the lugs 4a into bevels 3m and slots 3b through which slots the lugs have a free passing fit as the shell 4 becomes disengaged from the head 3a. By reference to Fig. 6 it can be observed that the pins will remain and will be guided within the slots 3d until the lugs have entered slots 3b.

Fig. 8 illustrates a modified form of head 3Ac which may be employed to replace the head 3a, Fig. 1. The single slope 3Ac serves to guide the pins into the slots 3Ab while the shank 3A corresponds to the shank under head 3a, Fig. 1, all other portions of this part not shown being the same as those of the part 3 in Fig. 1.

If it is desired to lower a bit, core barrel, or other part through the drill pipe, and leave it in the pipe, the shell 4 and head 3 are assembled with the pins 4c in the position shown at 4c''', Fig. 7, before the device is lowered into the pipe. When the assembly lands on bottom the pins land upon lower inclined surfaces 3h' by which the pins are guided into the position shown at 4c''', and when the cable is raised the pins land upon upper inclined surfaces 3j' by which they are guided into the open slots 3d, enabling the shell 4 to be withdrawn from head member 3, as has been previously explained.

In the first modified form of the invention illustrated in Figs. 9 to 15, both inclusive, the pins of the first form are removed from the shell and, in place thereof, one pin is placed through the head of the male member and the slots which actuate the shell are removed from the head of the male member, as in the preferred form, and placed in the shell in this embodiment.

The first modified form is operated in the same manner, and may be used for the same purposes as was stated for the preferred form.

The pin 8 secured through enlarged head 8a by welds 9a is positioned midway between slots 8b, as clearly appears in Fig. 11. The lugs 12 are oppositely positioned through the walls of shells 10 and 11a within which they are secured by welds 12a which welds not only secure the lugs in place but also secure outer shell 10 and actuator shell 11a together as appears in Figs. 12 and 15. The opposing ends of the lugs are spaced apart to freely allow longitudinal movement between them of the rod-like member 8 below head 8a, as appears in Figs. 12 and 15. The slots 8b are of such width as will freely allow the lugs 12 to pass through them. These lugs are preferably somewhat wider than the diameter of the

pins. The upper section 11 of the actuator or shell is secured within outer shell 10 by welds 10a and by threaded connection with rod 14 which is in turn secured to cable socket nipple 13 by welds 13a and 13b. The cable 6 may be secured within cable socket nipple 13, similar to cable socket nipple 5, Fig. 1, by lead, solder, or babbitt 7. It will be understood that the lugs 12 may be made integral with shell 11a and that if such construction be employed, the shell 11a may be secured within shell 10 by welds similar to the welds 10a.

It being understood that the member 8 is threadedly or otherwise secured to the member 2 upon which it is desired to exert a pull and then release it, the shell 10 and connected parts are lowered into the drill pipe 1 by means of steel cable 6. The bevel 10b and upper tapered end of head 8a cause initial alignment of head and shell as the shell engages over the head, the finned member 2 serving to hold the member 8 central of pipe 1. Referring to Fig. 14, which shows the opposing ends of shell 11 and 11a developed or rolled out for a clear view of the slots, slopes, and pockets, it will be observed that the pin ends just before entering slots 11c are indicated at 9'. Descending slightly further, the extremities of pin 9 engage within upper pockets 11d.

The two sloping surfaces 11b and 11b', Fig. 9, guide the extremities of pin 9 into oppositely positioned slots 11c and at the same time guide the lugs 12 into the oppositely disposed slots 8b, bevels 8c aiding the lugs to find these slots on the downward thrust of the member 10, bevels 8d serving a similar purpose when the cable is pulled upon. When the pin extremities contact upper sloping surfaces 11e, Fig. 14, which guide the pin extremities into upper pockets 11d, where the pin extremities are indicated as 9'', the cable is then pulled upon until the pin extremities encounter the sloping surfaces 11f by which the pin extremities are guided into lower pockets 11a' where they are indicated at 9''' at which time the lugs 12 are under and contacting the unslotted portion of head 8a (see Figs. 10, 12, and 15).

The slight clearance between the pins ends indicated at 9''' and the bottom of lower slots 11a' provides that all the cable pull is absorbed by the lugs; the purpose of the pin being to manipulate the lugs 12 into proper position to contact the unslotted portion of head 8a at the time of the cable pull. Such pulling force is now exerted upon the cable as may be desired; after which the cable is given slack until the pin ends contact the upper sloping surfaces 11e' by which they are guided into upper pockets 11d' in which position they are indicated at 9'''. The cable is again pulled upon until shell 10 and its contained assembly is raised. The pin extremities then contact lower sloping surfaces 11f' by which they are guided into the open slots 11c, permitting shell 10 and its contained assembly to be withdrawn from the drill pipe by cable 6, because in this position of the parts the lugs 12 are again in alignment with the slots 8b of the head 8a. This is so because the slots 8b are positioned in the head 8a 90° around from pins 9 and the slots 11c are positioned within the shell 11a 90° around from the lugs 12. It will also be noted that the ends of pin 9 are engaged within the slots 11c while the lugs 12 are approaching the slots 8b from either direction and remain so engaged until the male and female members become fully engaged or disengaged. The four upper pockets 11d and 11d' are shown equally spaced 90° apart,

the offset between the upper and lower pockets being 45°.

The oppositely disposed slots and inclined surfaces are arranged one above the other as was explained for the similar features in the preferred embodiment. It will be observed that the pin extremity which enters through one slot 11c is released through the opposite slot 11c, these slots being 180° apart.

It will be observed that the wedge shaped surface 11b is somewhat lower than the companion wedge shaped surface 11b' in order that the lower of these surfaces will act as a pilot to guide the companion wedge past the ends of pin 8; thereby avoiding the possibility of both wedges becoming occasionally impinged upon the pin in the engaging movement.

If it be desired to lower into the pipe the head member 8, which may be a bit, core barrel, or the like, and leave it there, the male and female members may be assembled exteriorly of the well with the ends of pin 9 resting in lower pockets 11a'. When the assembly lands and the cable is given slack the lower member will be released in the manner heretofore explained. Manifestly, the part so left in the drill pipe can be again fastened to for withdrawal by a return trip with shell 10, as is apparent from the previous explanation.

The second modified form of the invention is illustrated in Figs. 16 to 22, both inclusive. This construction illustrates that a plurality of cable pulls and releases of the cable pull may be employed before the lower member will be released.

The head and slot member 15 may be attached to any of my said wire line well testing tools or, preferably, to a replaceable bit, core barrel, fishing tool or the like.

The lug 17 may be secured within the shell 16 by weld 17a, as appears in Figs. 16, 17, 19, and 22. Slight clearance is provided between the inner edge of this lug and the member 15, as will appear from an examination of Figs. 17 and 19. The enlarged head 15a is cut away at 15b to allow the head to pass the lug. The somewhat wedge shaped inclined surface 15c causes the pin 18 to pilot the lug 17 into position so that the lug and head can pass each other. The pin may be secured in shell 16 by weld 18a, as appears in Figs. 16, 18, and 19.

The head and slot member 15 corresponds to the similar member 3 of the preferred embodiment. Actuator segment 15c is shown developed or rolled out in Fig. 21 wherein the pin 18 is indicated at 18c just before it enters the slot 15d. The sloping surfaces 15e guide the pin 18 and lug 17 into the space formed by the cut away portion 15b, as is apparent in Figs. 16 and 22. The head and slot member 15 being disposed, as shown in Fig. 16, the shell member 16 and connected parts are lowered into the pipe 1 upon steel cable 6 until pin 18 and lug 17 pass the head 15a and pin 18 after entering entrance and exit slot 15d lands upon lower sloping surface 15f, Fig. 21, by which the pin is guided into one of the lower pockets where it is identified by the reference 18d. The cable is then pulled upon until the pin contacts the upper inclined surface 15g by which it is guided into the upper pocket where it is indicated at 18e. The cable is then given slack until the pin contacts the lower inclined surface 15h by which it is guided into another lower pocket in which it is identified by the reference 18f. The cable is again pulled upon until the pin contacts the upper inclined

surface 15k by which it is guided into the upper pocket in which it is indicated at 18g. The cable is again given slack until the pin lands upon the lower inclined surface 15m where it is identified by the reference 18h.

When the cable is again tightened the pin contacts the upper inclined surface 15n by which it is guided into the upper pocket where it is identified as 18k. The cable being again slackened, the pin contacts the lower inclined surface 15p by which it is guided into the lower pocket where it is shown at 18m. The cable being once more tightened, the pin engages the upper sloping surface 15q by which it is guided into and out of slot 15d, the place of entrance; thus completing the release of head 15a. At each cable pull until the last, the head 15a was engaged under the lug 17.

The dotted-in position of the lug 17 in Fig. 20 shows the relative position of the lug 17 and head 15a when the pin is in the position shown at 18e, Fig. 21. Each pull of the cable causes the lug to change position, with reference to the head, by 90°. This is true because the upper and lower pockets, respectively, are spaced around the circumference of segment 15c at regular intervals of 90°, the slot 15d occupying one of these upper intervals; the circumferential offset between each of the proximate upper and lower pockets being 45°. It will be observed that the pin 18 is still in slot 15d, in which it has a close sliding fit, as the lug 17 is withdrawn into the cut away portion 15b of the head 15a. The bevel 15r is to aid the pin 18 and slot 15d in guiding the lug 17 into cut away portion 15b.

If the male and female members of this device be assembled before they are run into the pipe, it is apparent that the number of cable pulls required to release the lower member after it lands will be determined by which one of the upper pockets the pin is placed in when the device is lowered into the pipe. While the upper and lower pin pockets are shown separated by 90° in each embodiment, it is apparent that any other number of pockets may be employed. The pockets should be, however, preferably, separated by uniform spacing, although the angles of the several slopes which cause the pins to rotate the female member could be different one from the other and thereby permit irregular spacing of the slots if, for any reason, such spacing should be desired.

It is apparent that the upper and lower slopes in Figs. 7, 14, and 21 can be reversed to cause the pins to rotate the female member in the opposite direction if such should be desired.

In each embodiment of the invention the offset between the upper and lower pockets in Figs. 7, 14, and 21 may be more or less than 45°; the only limitation as to the relative position of the upper and lower pockets being that the inclined surfaces opposing them must overlap the pockets so that the center of the pins will engage the sloping surfaces when the pins move out of the pockets.

Manifestly, many minor changes in construction can be made within the scope and purpose of this invention as disclosed by the stated objects and appended claims.

I claim:

1. A releasable connection comprising a member having a head, and an actuator segment in spaced relation thereon, a cable, a shell attached to said cable and adapted to pass over the head and actuator segment, an inwardly projecting

pin in said shell to engage the lower surface of said head to form an assembly which may be moved by a pull applied to the cable, and means carried by said shell to coact with said actuator segment to release the shell by a predetermined series of pulls upon the cable.

2. A releasable connection comprising a head, an actuator, said head and actuator being in fixed spaced relation upon a member to be engaged and released, a cable, a shell on said cable and adapted to pass over said head and said actuator segment, aligned slots in the head and actuator, spaced inwardly projecting pins in said shell, and means for rotating the shell to bring the uppermost of said pins into engagement with the nether surface of said head when the lowermost of said pins is lowered into and then lifted within the actuator.

3. A releasable connection comprising a head attached to a member to be engaged and released, a slot longitudinally of the head, a cable, a shell attached thereto and adapted to pass telescopically over said head, a lug in said shell, means for guiding said lug longitudinally of the slot, a pin extending outwardly from said head, and means in said shell engageable by said pin for rotating the shell and bringing the lug into engagement with the head when the shell is lowered thereover and is thereafter lifted by the cable.

4. A releasable connection comprising a member having a head thereon, a slot longitudinally of said head, a shell, said shell surrounding the member and head, a lug in said shell for passage through said slot and engagement with the nether surface of the head, a pin extending outwardly from said head and means carried by the shell for engaging said pin and effecting relative rotation between the sleeve and head to guide said lug into said slot and to thereafter release the lug from engagement with the head by a predetermined succession of pulls upon the cable.

5. A releasable connection comprising a member having a head, an actuator segment on the member in spaced relation with the head, longitudinal slots in said head and segment, a shell assembly adapted to be moved over the member and having spaced pins adapted to enter the slots, and an annular series of guiding surfaces on the actuator segment to be engaged by the foremost pin to angularly orient the assembly about the member.

6. A releasable connection comprising a member having a head, a slot longitudinally of said head, a wedge shaped outer surface on the head tapering toward said slot, a cable, a shell attached to said cable and adapted to pass over the head, spaced inwardly projecting pins in said shell, an actuator segment on said member, a slot in said actuator adapted to receive one of said pins, and an annular series of guiding surfaces on the segment engageable by such pin to rotate the shell and angularly orient the other pin about the inner surface of the head.

7. A releasable connection comprising a connector member having a head to be engaged and released, a slot longitudinally of the head, a second connector member comprising a shell assembly adapted to be moved over the head, said assembly including a lug adapted to pass through the slot to engage the inner surface of the head so that a pull may be exerted upon the head by the assembly, and coating means on said head and in said shell for angularly orienting the lug about the inner surface of the head, said last

mentioned means including a pin on one of the connector members and an actuator on the other of said members, a slot in said actuator adapted to receive said pin, and an annular series of guiding surfaces engageable by the pin to produce relative rotation of the connector members to angularly orient the lug about the inner surface of the head.

8. A releasable connection comprising a first member having a head axial therewith, said head having two arcuate projections formed by opposite longitudinal peripheral slots, one of said projections being longer than the other, and an actuator in spaced relation to said head and axial therewith, said actuator consisting of first and second segments in spaced relation to each other, the first segment being nearest to said head and having a plurality of slots, inclined surfaces and intermediate pockets confronting but in slightly rotated relation to slots, pockets, and inclined surfaces on said second segment so that the inclined surfaces of one segment overlap those of the other to place the pockets of said second segment opposite the inclined surfaces of said first segment, and a second member comprising a shell adapted to slidably receive within it said head and actuator, said shell having two opposite lugs and opposite pins, the lugs and pins being adapted to pass through said slots of the head, the pins passing first to guide the lugs, the lugs in turn being adapted to coact with said slots of the head to guide the pins through the slots in the first of said segments until said pins engage two of the sloping surfaces of the second segment to be guided thereby into the pockets thereof as said members are telescopically engaged from which position two of the sloping surfaces of the first segment will cause rotation of said shell relative to said head when said first member and shell are telescopically moved in reverse direction to place said arcuate projections in contact with said lugs whereby said first and second members are locked together so as to become released by telescopically moving said members into deeper engagement which forces said pins upon two other inclined surfaces of said second segment and into two other pockets thereof and by moving said members apart to force said pins against the opposed sloping surfaces of the first segment and into the open slots thereof.

9. A releasable connection comprising a first member having a head axial therewith, said head having two arcuate projections formed by opposite longitudinal peripheral slots, and having a sloping outer end, the slope thereof being diagonally transverse of said slots, an actuator in spaced relation to said head and axial therewith, said actuator consisting of first and second segments in spaced relation to each other, the first segment being nearest to said head and having a plurality of slots, pockets, and inclined surfaces confronting, but in slightly rotated relation to slots, pockets, and inclined surfaces of said second segment so that said inclined surfaces of one segment overlap those of the other to place the pockets of said second segment opposite the inclined surfaces of said first segment, and a second member comprising a shell adapted to slidably receive within it said head and actuator, said shell having two opposite lugs and opposite pins, the lugs and pins being adapted to pass through said slots of the head, the pins passing first to guide the lugs, the lugs in turn being adapted to coact with said slots of the head to guide the

pins through the slots in the first of said segments until said pins engage two of the sloping surfaces of said second segment to be guided thereby into the pockets thereof as said members are telescopically engaged from which position two of the sloping surfaces of the first segment will cause rotation of said shell relative to said head when said first member and shell are telescopically moved in reverse direction to place said arcuate projections in contact with said lugs, whereby said first and second members are locked together so as to become released by telescopically moving said members into deeper engagement, forcing said pins upon two other inclined surfaces of said second segment and into two other pockets thereof and by moving said members apart to force said pins against opposed sloping surfaces of the first segment and into the open slots thereof.

10. A releasable connection comprising a first member having a conical head axial therewith, said head having two opposite longitudinal slots forming two lateral projections each having a transverse pin central thereof, and a second member comprising a tubular shell having two opposed arcuate longitudinal ribs formed by two opposite internal slots, one of said ribs being longer than the other, two opposite lugs in said shell, each being central of one of said ribs, two series of inclined surfaces in spaced relation to each other, the space between said series having communication with said internal slots of said second member, said shell being adapted to telescope said head so that said pins will enter said internal slots and contact two of said inclined surfaces to cause partial rotation of said members relative to each other at the limit of such telescopic engagement, such rotation continuing by similar action of said pins relative to other surfaces of said series as said members are moved apart, whereupon said lugs will engage said lateral projections to lock said members together until said telescopic movement urging said members together is repeated and reversed, whereupon by similar action of said pins relative to others of said surfaces, said pins and internal slots will be brought again into alignment to separate said members.

11. A releasable connection comprising a first member having a head axial therewith and having a longitudinal flat surface on one side thereof, a sloping end terminating in a peripheral circular knife-edged point, an actuator in spaced relation to said head and axial therewith, said actuator consisting of a first and a second segment in spaced relation to each other, the one of said segments nearest to said head having a slot and inclined surfaces confronting but in slightly rotated relation to inclined surfaces on said second segment so that said inclined surfaces overlap each other, and a second member having a shell adapted to telescopically receive said head and actuator, said shell having an internal lug and a pin in spaced relation to said lug, said pin being adapted to pass through the clearance between said first and second mem-

bers opposite said flat surface, the pin passing first to guide the lug and the lug in turn being adapted to coast with said flat surface to guide the head thereby until said pin passes through said slot of the first segment and engages one of the sloping surfaces thereof to be moved opposite a sloping surface of the first segment and to be moved farther in the same direction by a slight parting movement of said members, thereby placing said head in locked relation to said lug from which position the other sloping surfaces will urge said pin to rotate said members continually relative to each other as they are telescopically urged alternately together and apart to maintain said locked engagement until said flat surface again confronts said lug to release the connection.

12. In a releasing connection, the combination of a male and a female member adapted to have telescopic relation with each other, a pin and a lug in the female member, the pin being proximate one end thereof and the lug being inward of the pin, a longitudinally slotted head on the male member, said slot being adapted to admit said pin and lug, an actuator on said male member, said actuator being in two aligned segments, the first segment being nearest to said head and having a series of slots and inclined surfaces and the other of said segments having a series of inclined surfaces and pockets, said inclined surfaces and slots of the first segment being in slightly revolved relation to the inclined surfaces and pockets of the second segment, said pin being adapted to pass through one of the slots in said first segment and to coast with said inclined surfaces of both segments to engage and disengage said head with said lugs responsive to reciprocal telescopic movements of said members, and a closure in said shell to limit the depth of such telescopic engagement independently of said pins and inclined surfaces.

13. In a releasing connection, the combination of a male and a female member adapted to have telescopic relation with each other, a plurality of pins and lugs in the female member, the pins being proximate one end thereof and the lugs being inward of the pins, a longitudinally slotted head on the male member, said slots being adapted to admit said pins and lugs, an actuator on said male member, said actuator being in two segments aligned with said head, the first segment being nearest to said head and having a series of slots and inclined surfaces and the other of said segments having a series of inclined surfaces, said inclined surfaces of the first segment being in slightly revolved relation to the inclined surfaces of the second segment, said pins being adapted to pass through said slots in the first segment and to coast with said inclined surfaces of both segments to engage and disengage said head with said lug responsive to reciprocating telescopic movements of said members, and means independent of said pins and inclined surfaces to limit the depth of such telescopic engagement.

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