April 14, 1964 H. E. SIMPSON 3,129,009

HYDRAULIC LINE WIPER

Filed Oct. 10, 1960 3 Sheets-Sheet 1

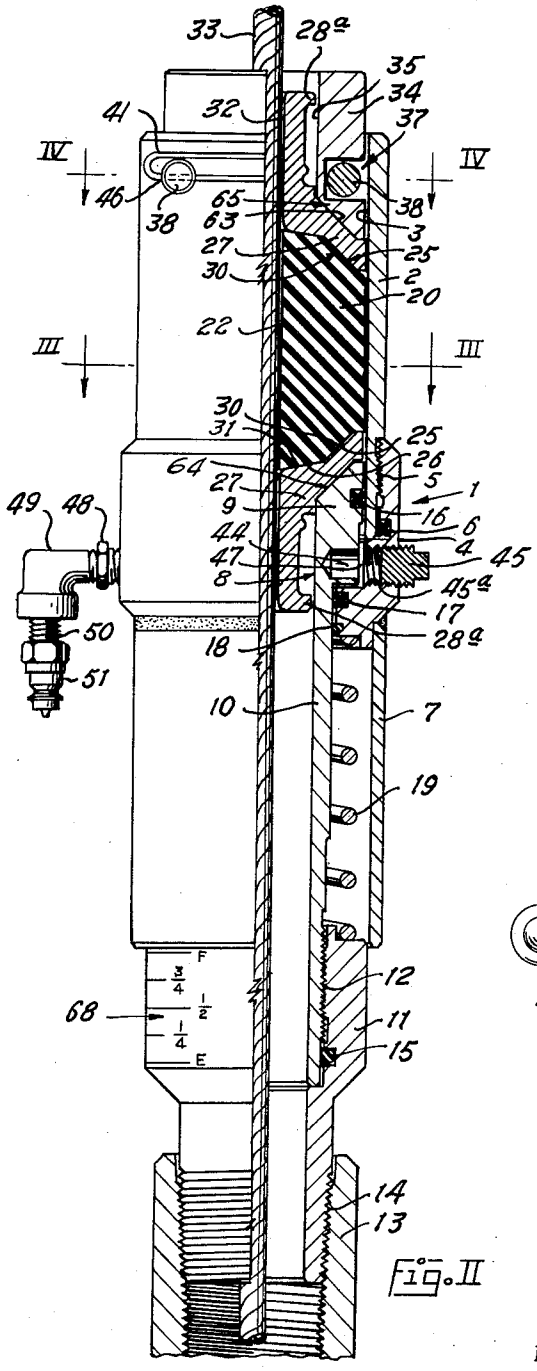


Fig. II

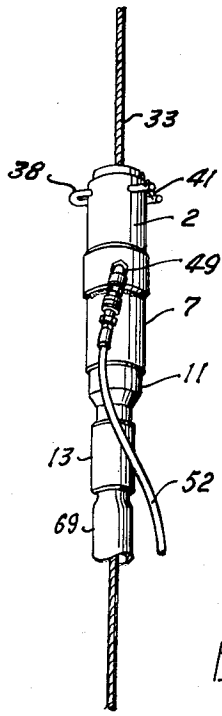


Fig. I

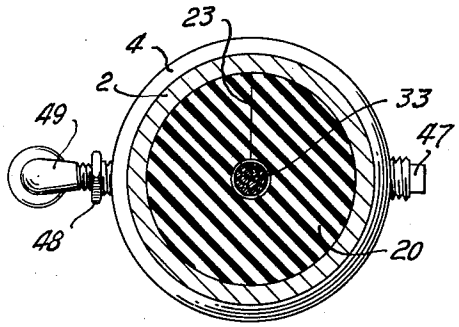


Fig. III

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HYDRAULIC LINE WIPER

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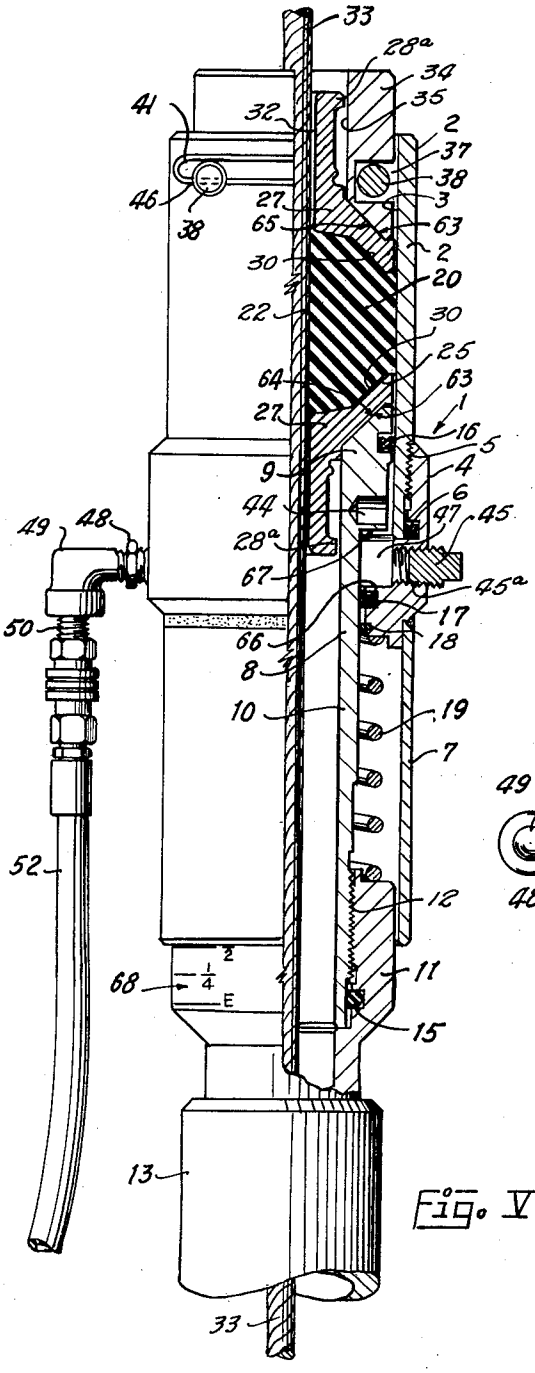


Fig. V

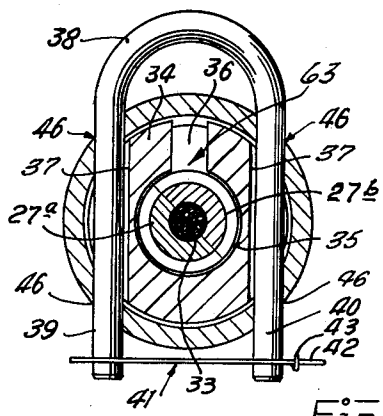


Fig. IV

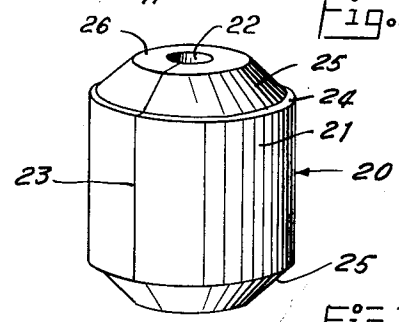


Fig. VI

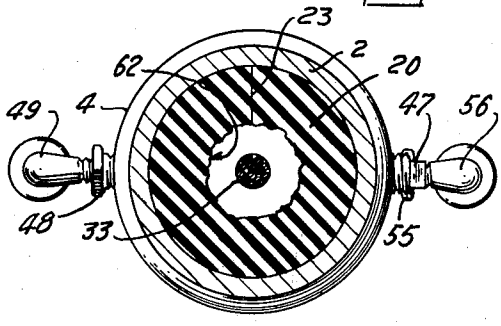


Fig. VIII

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HYDRAULIC LINE WIPER

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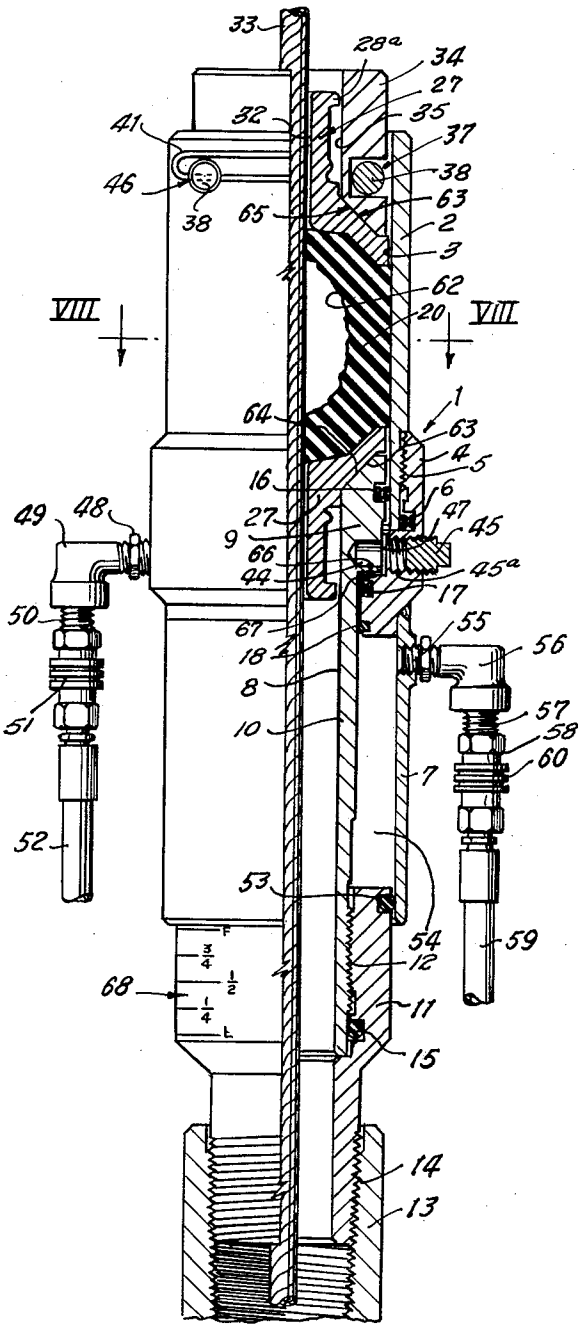


Fig. VII

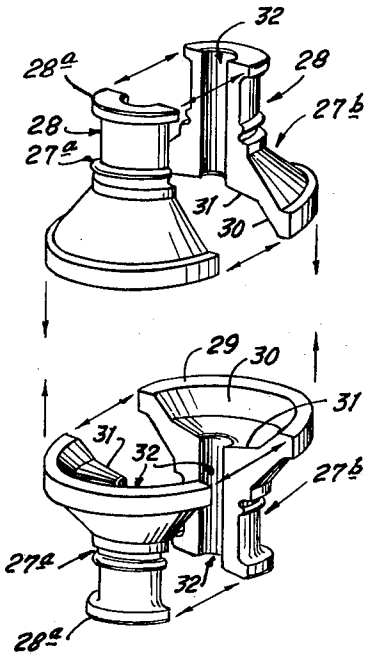


Fig. IX

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United States Patent Office 3,129,009 Patented Apr. 14, 1964

3,129,009

HYDRAULIC LINE WIPER

Harry E. Simpson, Dallas, Tex., assignor, by mesne assignments, to Dresser Industries, Inc., Dallas County, Tex., a corporation of Delaware

Filed Oct. 10, 1960, Ser. No. 61,764
7 Claims. (Cl. 277—4)

This invention is concerned with a device for wiping a twisted steel cable, commonly referred to as a "wire line," as the line is being withdrawn from a well, such as an oil, gas or water well, during or after subsurface well operation such as gun perforating, swabbing, or other wire line operations, or in the setting or retrieval of packers, chokes or the manipulation of other devices in a well. It could, of course, be used to wipe a rod drawn therethrough.

It has been the practice in such subsurface operations, employing a wire line, to mount a wiper device, including an elastic, rubber or plastic element in a suitable housing on the well head, and draw the wire line therethrough, with the wiper element pressed thereagainst, to remove oil, mud, or other fluid material collected on the wire line from the well, as the wire line is drawn therethrough.

Such devices have customarily employed manually adjustable threaded glands or rams to tighten the wiper element against the wire line as the wiper element was drawn therethrough, and such devices customarily had to be tightened several times while the wire was being withdrawn from the well. They also had to be loosened before lowering the wire line therethrough. Such procedure was customarily carried out by a workman climbing up on a scaffold to tighten or loosen the wiper element either by means of a wrench or by manually rotating a handle. This procedure was unsafe and resulted in accidents and injury to workmen.

Furthermore, such old type wiper devices usually employed thin, disc-like wiper elements, sometimes stacked in multiples, which did not provide for uniform and adequate pressure against the wire line to perform an adequate wiping operation, and were quickly worn out or torn up by the irregular surface contour of the cable being drawn therethrough.

In previous such wiper devices, the changing of the wiper element therein was a cumbersome procedure in that it was necessary to unthread and dismantle the housing and/or the gland, or glands, therein in order to remove or replace the wiper element. This, of course, resulted in unnecessary expenditure of time and labor.

Furthermore, in such previous wiper devices, it was not possible to visually determine the extent of wear of the wiper element in such device at various stages of its use. The only way the wear could be determined was to dismantle and separate the housing to visually inspect the wiper element to determine whether it should be replaced.

The present invention is intended to overcome the problems recited above, and others, and has among its objects the following:

The provision of a line wiping device wherein the wiper element therein is tightened, loosened or otherwise adjusted by hydraulic pressure actuated from a remote position, thus resulting in safety of operation and constant and automatic adjustment of the tension of the rubber.

The provision of a line wiper device wherein the rubber wiping element therein may be changed quickly and easily without unthreading any portion of the housing or rubber confining elements, without removing the wiper device from the line, and with a minimum expenditure of time and labor.

The provision of a line wiper device which includes a relatively large one-piece elastic wiping element which provides for long life, resulting in economy, and reducing

the amount of lost time and labor in changing wiper elements.

The provision of such an elastic wiper element, confined between complementary, substantially dish-shaped bushings at each end, wherein the wiper element and the bushings have mating surfaces thereon, which mating surfaces cause the rubber of the wiper element to feed inwardly toward the line being drawn therethrough, as well as longitudinally, as the piston is actuated, to thereby uniformly distribute the wear on the inner side of the wiper element, and to effect a constant seal until the rubber is almost completely used up. Such results in not only effective cleaning and wiping of the wire line being drawn through the wiper element, but results in economy of material, time and labor.

The provision of such a hydraulically actuated wiper device wherein the seal head therein is anchored to the well pipe to thereby cause the housing for such device to move downwardly when hydraulic pressure is exerted against the piston, thereby pulling downward on the rubber wiper element to equalize the wear thereon.

The provision of a spring or hydraulic means to return the hydraulic ram to normal, relaxed position, to thereby relax the wiper element when the hydraulic pressure for moving the piston is released.

The provision of means for changing of rubber wiper elements in a line wiper device, without dismantling the housing therefor, and including support bushings, in separable halves at each end of the rubber wiper element, a slit through the side of the rubber wiper element, and a gap through the wall of the retainer element bearing against the upper bushing, whereby these various elements may be placed about and removed from the wire line through the upper end of the housing for the device, without removing the housing of the wiper device, from the wire line, and without the necessity of removing hydraulic connections from the housing therefor.

The provision of a hydraulically actuated line wiper device, wherein hydraulic pressure may be employed to push the elastic wiper element and supporting elements therefor, out of the housing for replacing the rubber wiper element after disconnecting the removable retainer element from the housing.

The provision of a hydraulically actuated line wiper device, wherein visual indication is provided exteriorly of the housing therefor to indicate the extent of wear of the elastic wiper element therein, to thereby indicate when such wiper element should be replaced.

Other and further objects of this invention will become apparent upon reading the detailed specification hereinafter set forth, and by referring to the drawings annexed hereto.

Suitable embodiments for practicing the invention are shown in the attached drawings, wherein:

FIGURE I is a perspective view of the line wiper device attached about a line being wiped, and secured to the upper end of a well pipe;

FIGURE II is a quarter-sectioned, elevational view of the line wiper device attached about a line being wiped, and showing the elastic wiper element in relaxed condition;

FIGURE III is a transverse, cross-sectional view taken along the line III—III of FIG. II;

FIGURE IV is a transverse, cross-sectional view taken along the line IV—IV of FIGURE II;

FIGURE V is a quarter-sectional, elevational view of the line wiper device, showing the elastic wiper element in compressed condition about the line, as it would appear in wiping condition as the line is drawn upwardly therethrough;

FIGURE VI is a perspective view of the elastic wiper element employed in the line wiper device;

FIGURE VII is a quarter-sectional, elevational view of a modified form of line wiper device, employing my invention, which incorporates hydraulic means for returning the parts to normal position when no hydraulic pressure is exerted against the head thereof;

FIGURE VIII is a cross-sectional view taken on the line VIII—VIII of FIGURE VII showing the wiper rubber in relaxed condition, after it has been used for a considerable length of time, wherein the wear pattern on the inside of the rubber wiper element is shown, evidencing the fact that the wear pattern is evenly distributed about the passage through the rubber wiper element, as the elastic material of the wiper element is fed toward the wire, and the wire line is being wiped by hydraulic pressure exerted thereagainst; and

FIGURE IX is an expanded, perspective view of the upper and lower bushings for supporting the elastic wiper element in the housing, which bushings are made in complementary halves.

Numeral references are employed to designate the various parts shown in the drawings, and like numerals indicate like parts throughout the various figures of the drawings.

The numeral **1** indicates the housing for the line wiping device, which is generally cylindrical in shape and is made of durable metallic material, such as steel or brass.

Included as a part of the housing **1** is a hollow, cylindrical barrel **2** at the upper end thereof, having a smooth surfaced bore **3** therein.

The cylindrical barrel **2** is threadedly engaged to the hollow adapter head **4** by companion threads, as indicated at **5**. The lower end of the barrel **2** is sealed against the inner wall of the adapter head **4** by means of a suitable sealing ring **6** mounted in an annular channel on the inner side of the adapter head **4**.

An annular hollow skirt **7** is secured to the lower side of the adapter head **4** as by welding, said skirt extending downwardly about the spring **19** to protect same, said skirt **7** also performing the function of acting as an element of the means for indicating the condition of wear of the elastic wiper element.

A tubular member, generally indicated at **8**, has a seal head **9** thereon with a suitable seal ring **16** carried in a groove thereabout. Seal ring **16** is slidable against the inner wall of the barrel **2** in sealing relationship therewith.

The tubular member **8** also includes a hollow cylindrical lower extension **10**, which is attached at its lower end to the sub, or base **11**, by means of companion threads **12**. The sub **11** is in turn threadedly engaged with a coupling **13** by companion threads **14**, said coupling **13** being attached at its other end to the tubing or other pipe **69** extending into a well (not shown).

A seal ring **15** is interposed between the lower end of the extension **10** of the tubular member **8** and the inner wall of the sub **11**, to provide a fluid-tight joint therebetween.

A seal ring **17** is carried in an annular groove about the inner, lower side of the adapter head **4** and is in slidable sealing engagement with the outer wall of the extension **10** of the piston **8**. A wiper ring **18**, made of resilient material, is mounted in a groove about the inner side of the lower end of the adapter coupling **4**, and is in slidable engagement with the outer surface of the extension **10** of the tubular member **8**, so as to wipe fluid from, and provide a clean surface on, the outer side of the piston extension **10** against which the seal ring **17** may seal.

It will thus be seen that the tubular member **8** is secured at its lower end, through the sub **11** and coupling **13**, to the well pipe **69** and cannot move longitudinally with relation to the well pipe, whereby when hydraulic force is exerted behind the piston head **9** in the manner which will be hereinafter described, the housing **1**, including the barrel **2**, adapter head **4** and skirt **7** will be caused to move downwardly with relation to the tubular member **8**. Since the gate or retainer member **34** is secured to the barrel **2**, in the manner which will be hereinafter described, the rubber sealing element **20** will be compressed and radially expanded between the upper and lower bushings **27**, because the lower bushing **27** is positioned against the upper end of the immovable tubular member **8**.

The coil spring **19** is extended about the lower extension **10** of tubular member **8**, and is confined between the upper end of the sub **11** and the lower side of the adapter head **4**. Thus the spring **19** has a tendency to push the housing **1** upwardly with relation to the tubular member **8**, so that when the housing **1** and tubular member **8** have been telescoped with relation to each other by hydraulic pressure exerted against the piston head **9**, as shown in FIG. V, and such hydraulic pressure is released, the spring **19** will relax and cause the housing **1** to move back to normal relaxed position, as shown in FIG. II.

The elastic wiper element **20**, which is made of elastic material such as a rubber or synthetic rubber compound, such as neoprene, consists of an elongated, solid piece of resilient material, and has a passage **22** therethrough to receive the wire line or cable **33**. Such wiper element **20** is shown in perspective in FIG. VI and includes a cylindrical outer surface **21** thereon, and has a wire receiving passage **22** passing centrally therethrough. A slit **23** is provided through the wall of the elastic element **20** which communicates with the passage **22**. The slit **23** may be forced apart to allow the wiper element to be passed about the wire line **33** so that the wire line **33** may extend through such passage **22**, as shown in FIG. I.

The rubber element **20** is bilaterally symmetrical in that the opposite ends are identical in shape. On each end thereof there is a relatively narrow circumferential surface **24** which is substantially perpendicular to the longitudinal axis of the body of the wiper element; and the ends of the wiper element **20** are tapered as indicated at **25**, and are terminated at their outer end by surfaces **26**, which are substantially perpendicular to the longitudinal axis of the body **20**. The ends of the rubber element **20** and the complementary shaped supporting bushings **27** at each end thereof, are substantially frusto-conical, and are important to the functioning of the device, as will be described hereinafter.

The elastic wiping element **20** is placed about the wire line **33** in the manner herein described, and is inserted in the barrel **2** between complementary shaped bushings **27** at the upper and lower ends thereof. The bushings **27** are made in complementary halves **27*a*** and **27*b*** (FIG. IX), so that they may be placed about the wire line **33** when the rubber sealing element **20** and the bushings **27** are assembled in the barrel **2**, without the necessity of passing the ends of the wire line **33** therethrough, thereby avoiding the necessity of removing the wire line from the housing **1** when a wiper element is changed.

The bushing halves **27*a*** and **27*b*** are designed with the necks **28** thereon, having enlarged outer ends **28*a***, to slidably contact the inner wall of the extension **10** of the cylinder of the piston **8** and the inner wall of the retainer member **34**, in order to balance and stabilize the bushing elements when disposed in the housing. The inner surfaces of the bushing parts **27*a*** and **27*b*** are formed to provide surfaces therein coinciding with the shaped surfaces on the outer ends of the rubber sealing element **20**. Thus a relatively narrow end surface **29**, which is perpendicular to the longitudinal axis of the bushing members **27*a*** and **27*b***, is provided to coincide with the surface **24** on the ends of the wiper element **20**; a tapered surface **30** is provided on the inner sides of the bushing elements **27*a*** and **27*b*** to coincide with the tapered surfaces **25** on the rubber sealing element **20**; and a relatively straight surface **31**, substantially perpendicular to the axis of the wiper element and the bores through the bushing element **27**, are provided to coincide with the like

surface 26 on the opposite ends of the rubber wiper element 20. Semi-circular shaped complementary grooves 32 are provided on the inner sides of the segments 27*a* and 27*b*, which, when placed in coinciding relationship, as the bushing elements 27*a* and 27*b* would be assembled in the housing of the wiper device, would provide a passage substantially conforming to the diameter of the wire line 33 which would be pulled therethrough.

The retainer element 34 is generally cylindrical in shape, and has a cylindrical passage 35 therethrough and may be inserted in the outer end of the barrel 2 to retain the elastic wiper element 20 and the supporting bushings 27 therefor in the barrel when the wiper element and bushing assembly is mounted in the barrel 2.

The adapted element 34 has a gap 36, see FIG. IV, extending through the wall thereof communicating with the bore 35 therethrough, through which gap the wire line 33 may be passed when assembling same with the wiper element and the housing.

Grooves 37 are formed in opposite sides of the retainer member 34, which may be brought into alignment with the passages 46 formed through the wall of the barrel 2.

The legs 39 and 40 of a substantially U-shaped yoke 38 may be inserted through the passages 46 and the oppositely disposed grooves 37 to detachably secure the retainer member 34 to the barrel 2 to prevent same from being expelled from the barrel when pressure is exerted thereagainst by the member 8. The yoke 38 may be retained in place by means of a retainer pin 41, similar in shape and construction to an ordinary safety pin, having a shank 42 thereon which passes through aligned holes in the outer ends of the legs 39 and 40 and is hooked in place by spring action underneath a hook 43 provided on the other end of the retainer pin 41.

Provision is made for disassembling the tubular member 8 from the housing 1 for the purpose of replacing the piston seal rings 16 and 17 when required. For this purpose a socket 44 is provided in the head 9, and a plug 45 is threadedly positioned in a passage 45*a* through the wall of the adapter head 4. The plug 45 may be removed from the passage 45*a*, and a tool (not shown) may be threaded through the passage 45*a* until the inner end thereof is extended into the socket 44. Thereby the tubular member 8 may be held against rotation, while the base or sub 11 is unthreaded from the tubular member 8, and the barrel 2 may be unthreaded from the adapter head 4, to thereby permit the removal of the piston from the housing for the purpose of replacement of the seal rings 16 and 17 thereon.

Hydraulic fluid under pressure may be admitted to the area 47 in housing 1 behind the head 9, provided between the seal rings 16 and 17, by means of suitable fittings, including a bushing 48 screwed into a passage through the wall of the housing, an elbow fitting 49, a nipple 50, and a hydraulic fitting 51 which is attached to a hydraulic hose 52 extending to a hydraulic pump (not shown).

Each bushing segment 27*a* and 27*b* has a tapered surface 63 on the outer side thereof which is substantially parallel to the tapered surfaces 25 and 30 on the opposite ends of the rubber sealing element 20, and the inner sides of the bushing segments 27*a* and 27*b*, respectively. The tapered surface 63 on the innermost bushing 27 is seated on a coinciding tapered surface 64 on the upper side of the piston head 9. Also there is provided on the inner end of the retainer member 34 a tapered surface 65 which coincides with the tapered surface 63 on the outer side of the outermost bushing 27.

The tubular member 8 is limited in its inner movement with relation to the housing 1 by a shoulder 67 on the head 9 which comes into engagement with a coinciding shoulder 66 provided on the adapter head 4, see FIG. V.

The housing 1 may be slipped over the wire line or cable 33 when the well operation is begun, by extending the wire therethrough. This is done prior to dressing the wiper tool by inserting therein the rubber sealing element 20 and the supporting bushings 27 and retainer element 34. After the wire line has been extended through the housing 1, and the sub 11 has been attached to the lower end of the tubular member 8, and such sub is attached to the well pipe by the coupling 13, the wiper device may be dressed by placing two of the complementary segments 27*a* and 27*b* about the cable 33 and sliding them into the barrel 2, with the necks thereof extending downwardly into the bore of the extension 10 of the tubular member 8. The outer tapered surface 63 on the innermost segments 27*a* and 27*b* will come to rest on the upwardly facing complementary tapered surface 64 on the upper end of the head 9.

The elastic wiper element 20 is then slipped into the bore of the barrel 2 until it lands on the upwardly facing, dish-shaped inner side of the innermost bushing 27. The surfaces on the lower end of the rubber sealing element are thus in coinciding relationship with the surfaces on the inner, upwardly facing side of the lower bushing 27.

The upper bushing segments 27*a* and 27*b* are then positioned about the cable and slipped into the bore of the barrel 2 until they come to rest on the upper end of the elastic wiper element 20, with the coinciding substantially frusto-conical surfaces on the bushing and the wiper element in contacting relationship.

The retainer member 34 is then positioned about the wire line 33 by passing the wire line through the gap 36 in the wall thereof, and such retainer element 34 is inserted in the upper end of the barrel 2 until the tapered surface 65 on the lower end thereof comes to rest on the coinciding tapered surfaces 63 on the outer side of the bushing outermost segments 27*a* and 27*b*.

The grooves 37, in opposite walls of the retainer member 34, are then brought into alignment with the opposed passages 46 through the wall of the barrel 2, and the legs 39 and 40 of the yoke 38 are passed through the aligned passages 46 and grooves 34. The shank 42 of the retainer pin 41 is then passed through aligned holes in the ends of the legs 39 and 40 and the outer end of the shank 42 is hooked under the hook member 43 on the other end of the retainer pin to thereby position and retain the legs 39 and 40 of the yoke 38 through the aligned passages 46 to thereby position and retain the retainer member 34 in the upper end of the barrel 2. The retainer member 34 is thus positioned to confine the wiper element 20 and bushings 27 in the barrel 2, because such retainer member 34 is attached to the barrel 2, so that it will move downwardly with the housing members 2, 4 and 7 to compress and radially expand the rubber wiper element 20 against the wire line 33 as hydraulic force is exerted against the piston head 9.

As thus assembled, when hydraulic fluid under pressure is admitted to the annular space 47 within the housing 1, a force is exerted against the head which causes the housing 1 to move longitudinally with relation to the tubular member 8. Since the tubuler member 8 is attached in immovable position to the well pipe 69, the housing members 2, 4 and 7 will be caused to move downwardly with relation to the head 9. Since the retainer member 34 is secured to the barrel 2, such retainer element is pulled downwardly therewith. The lower bushing 27 is positioned against the upper end of the tubular member 8 so that the upper bushing 27 is brought downwardly with the housing, compression and radially expanding the elastic wiping element 20 and expanding it against the wire line 33, causing it to make a tight sealing engagement wtih the wire line so that when the wire line 33 is pulled upwardly through the sealing element, substntially all fluid, such as mud or oil, adhering to the wire line which has been picked up in the well, will be wiped from the wire line. Thus when the wire line emerges from the upper end of the wiper device it will be clean and dry to the extent that no mud, oil, or other undesirable material will be deposited on the truck and the line reel where the wire line is stored.

By reason of the inwardly facing, parallel, tapered surfaces 25 (on the ends of rubber element 20), 30 (on the inner sides of oppositely facing bushing segments 27*a* and 27*b*), 64 on the upper end of the piston head 9) and 65 (on the lower end of the retainer element 34), and the substantially perpendicular coinciding surfaces 26 (on the ends of the rubber wiper element 20), and 31 (on the inner sides of the bushing segments 27*a* and 27*b*), the rubber material of the wiper element 20 is uniformly and evenly fed inwardly toward the wire 33, and is also compressed longitudinally, so that a sealing and wiping engagement is maintained with the wire line 33 until the material of the rubber wiping element 20 is substantially used up. The angular components mentioned above cause the elastic wiper element to be fed inwardly toward the wire 33 and the perpendicular components mentioned above cause the elastic material thereof to be progressively contracted longitudinally by hydraulic pressure, as it is worn away. Thus the elastic sealing element 20 is long-lasting and is substantially consumed in its entirety.

Inspection of a worn wiper element 20 after a wire line has been pulled therethrough on several trips out of the well, shows that the wear pattern is substantially as shown at 62, see FIG. VII, wherein the rubber-like material is shown in relaxed condition. As shown at 62 the elastic is about one-half used up. A wiper element, worn as indicated at 62, would still be usable to perform a satisfactory wiping operation for several more trips of the wire line out of the well, and would virtually be worn paper-thin before it would become unusable. As a matter of fact the elastic material is so uniformly and evenly worn that it may perform a wiping operation until the upper and lower bushings 27 are virtually brought together.

A visual indication is provided to indicate the extent to which the elastic sealing element 20 is used up at any stage of use. Such is provided by the scale 68 appearing on the outer surface of the lower end of the base 11. The scale 68 indicates the extent to which the housing 1 and the piston 8 are telescoped together and thus indicates the extent to which wiper element 20 is worn away. The lower end of the skirt 7 moves along the scale 68 as it moves downwardly on the sub 11 and its position on scale 68 indicates the extent of consumption of the elastic wiper element 20.

In FIG. II the elastic wiper element is shown in relaxed unworn condition so that the unused rubber is indicated by the lower end of the skirt 7 coinciding with the "F" indicating full or unworn condition thereof. As shown in FIG. V the elastic material of the wiper element is compressed and has been worn to some extent, and is shown to be about one-half used up.

As the rubber is worn away and used up, the hydraulic pressure is continued to be exerted against piston head 9, continuing to shorten and expand the rubber of the wiper element into sealing engagement with the wire line 33, thus causing increased telescoping movement between skirt 7 and base 11, which is indicated on scale 68.

When it is desired to remove the worn out wiper element and replace same with a new one, such is a simple procedure and may be done without breaking threads or removing the wiper device housing from the wire line. This may be done by simply removing the retainer pin 41, withdrawing the yoke 38, and freeing the retainer member 34 from attachment to the barrel 2. By stroking the hydraulic pump, the housing 1 may be caused to move with relation to the piston 8, thus causing the piston to push the wiping element 20 and bushing assemblies 27 and retainer element 34 from the barrel 2. A new rubber sealing element may then be inserted in the barrel 2 about the wire line 33 in the manner hereinbefore described.

Of course, when the wire line 33 is being lowered through the wiper device, after being installed on the well, the wiper element 20 must be relaxed. This is accomplished by simply releasing the hydraulic pressure applied to the tubular member 8 thus allowing the spring 19, which has been compressed by the telescoping movement between the housing 1 and the tubular member 8, to return the housing 1 and tubular member 8 to normal, relaxed condition, as shown in FIG. II, thereby allowing the wiper element 20 to relax. Thus the necessity of manually retracting a ram or releasing a packing gland, as in previous manually operated devices, is avoided.

In FIG. VII, a modified form of the wiper device is shown wherein hydraulic power, in place of spring 19, is employed to return the housing 1 and piston 8 to normal, retracted position. In such modification a seal ring 53 is disposed in a groove extending about the upper end of the base 11, which seals between the outer surface of the base 11 and the inner wall of the skirt 7, thereby providing an enclosed, sealed chamber 54. Hydraulic fluid under pressure is admitted to the chamber 54 through a connection, including a bushing 55 (which is threaded into a passage through the wall of the skirt 7), a hollow elbow fitting 56, a nipple 57 threaded therein, and a hydraulic fitting 58 which is connected to a hydraulic fluid supply hose 59 by a suitable coupling 60.

Thus, in such modified form, when it is desired to relax the elastic wiper element 20, hydraulic fluid under pressure may be switched from supply hose 52 to hose 59 by a two-way valve (not shown), to thereby move the housing 1 upwardly with relation to the tubular member 8 to permit the elastic wiping element 20 to relax.

It will thus be seen that there has been provided by this invention an improved line wiper device which is hydraulically actuated to expand the elastic wiping element into sealing and wiping engagement with a wire line, cable, or rod drawn therethrough, which may be remotely operated with absolute safety, in which the rubber wiper element may be automatically relaxed for lowering of the line therethrough, in which the rubber sealing element is long-wearing and is substantially consumed before replacement is necessary, and wherein the rubber sealing element may be replaced without removing the wiper device from the wire line or cable and without the necessity of breaking threads, by the simple operation of removing a replaceable yoke from the retainer member holding the sealing element and bushing assembly in the upper end of the wiping device, wherein visual indication is given of the extent of wear of the wiper element while in use; and which device generally provides for safety and economy over previous devices of like character.

It will be understood that other and further embodiments of the invention may be devised without departing from the spirit and scope of the appended claims.

I claim:

1. In a device of the class described, a hollow housing having a wall; a wiper element made of resilient material disposed in the housing, the said wiper element having a passage therethrough to receive an elongated element to be wiped as it is drawn therethrough; a cylindrical outer surface on the wiper element; identical substantially frusto-conical shaped surfaces on each end of the wiper element; a support bushing in the housing at each end of the wiper elements; a support bushing in the housing at each end of the wiper element, said support bushings having identically shaped surfaces on the inner sides thereof coinciding with the surfaces on the ends of the wiper element; a retainer member detachably secured in the outer end of the housing contacting the support bushing in the outer end of the housing to retain the wiper element and bushings therein; a tubular member in the housing having an enlarged head thereon abutting the lower bushing and slidably and sealingly engaging the inner surface of the wall of the housing, said tubular member adapted to be connectable to a well pipe; an inwardly directed cylindrical shoulder on the housing positioned below said enlarged head and slidably and seal-

ingly engaging the outer surface of the tubular member; and pressure fluid means adapted to move said inwardly directed shoulder relative to the enlarged head.

2. The combination called for in claim 1 with the addition of a base member attached to the tubular member; and spring means disposed between the inwardly directed cylindrical shoulder and the base member arranged to urge the housing upwardly with reference to the tubular member.

3. The combination called for in claim 1 wherein the support bushings are made in complementary halves, the wiper element has a slit therein communicating with the passage therethrough, and the retainer member in the outer end of the housing has a longitudinal slot therein, whereby an element to be wiped may be placed within the bushings, the retainer member, and the wiper element.

4. The combination called for in claim 1 wherein means is provided for detachably securing the retainer member in the housing comprising aligned passages through opposite walls of the housing, transverse channels on opposite sides of the retainer member arranged to be aligned with the passages, a substantially U-shaped yoke member having spaced legs thereon extendable through the aligned passages and channels, and means attachable to the ends of the legs to prevent their withdrawal from the passages.

5. In a wiper device attachable to a well pipe; a housing; a central bore in the housing; a resilient wiper element slidably disposed in the bore, and having a passage therethrough adapted to receive an elongate element to be wiped; a retainer member detachably positioned in the outer end of the bore for preventing the wiper element from moving outwardly of the bore; a tubular member positioned in the bore below the wiper element; an enlarged head on the tubular member slidably and sealingly engaged with the bore wall, said tubular member being adapted for attachment to a well pipe; inwardly directed piston means attached to the housing and being slidably sealed to the tubular member and working against the enlarged head, whereby the housing moves downwardly with respect to the tubular member when fluid pressure is exerted between the piston and the enlarged head; and means to admit fluid under pressure to the interior of the housing between the piston means and the enlarged head to cause relative movement between the housing and the tubular member to radially expand the wiper element.

6. In a device of the class described, a hollow housing having a wall; an elastic wiper element disposed in the housing; means for retaining the wiper element in the housing; a tubular member having an enlarged head thereon slidably and sealingly disposed with relation to the inner side of the wall of the housing below the wiper element; an inwardly directed piston carried by the housing below the enlarged head and slidably and sealingly engaging the tubular member; means to admit fluid under pressure between the piston and the enlarged head to cause relative longitudinal movement therebetween; a base member attached to the tubular member arranged for attachment to a well pipe; and a skirt attached to the housing overlapping the base member.

7. The combination called for in claim 6 wherein a spring is disposed about the tubular member between the inwardly directed piston and the base member, arranged to urge the housing upwardly with relation to the base member.

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UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,129,009 April 14, 1964

Harry E. Simpson

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 8, lines 61 and 62, strike out "a support bushing in the housing at each end of the wiper elements;".

Signed and sealed this 4th day of May 1965.

(SEAL)
Attest:

ERNEST W. SWIDER
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