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Roberts

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[54] HYDRAULIC JARRING MECHANISM

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[51] **Int. Cl.**.....**E21b 1/10,** E21b 23/00

[58] **Field of Search**.....175/296, 297, 302; 166/178

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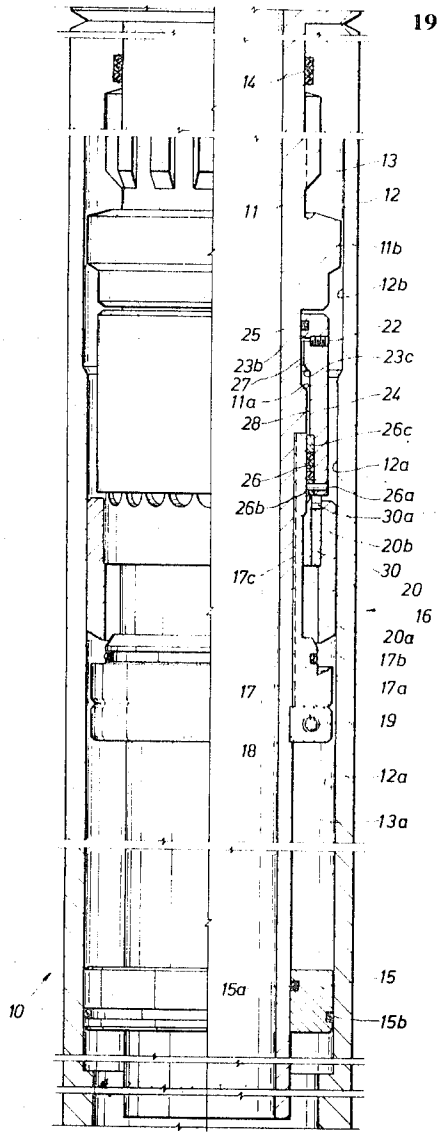
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[57] **ABSTRACT**

A bypass passage for displaced fluid in an hydraulic jarring device is equipped with a pressure responsive regulator sleeve which automatically moves axially within the fluid reservoir of the device to restrict fluid flow through the passage as required to maintain a relatively constant pressure in the compression chamber of the reservoir during an initial portion of the upstroke. An externally threaded plug is set within a threaded bore extending through the sleeve between the compression chamber and the bypass passage. The thread peaks on the plug are flattened which produces a helical orifice passage between the plug and bore which may be adjusted in length by rotating the plug which in turn establishes the high pressure value in the compression chamber. A thin wall segment supporting a portion of the plug threads moves radially in response to pressure changes to vary the cross-sectional dimensions of the orifice to assist in pressure regulation.

19 Claims, 4 Drawing Figures



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2 Sheets-Sheet 1

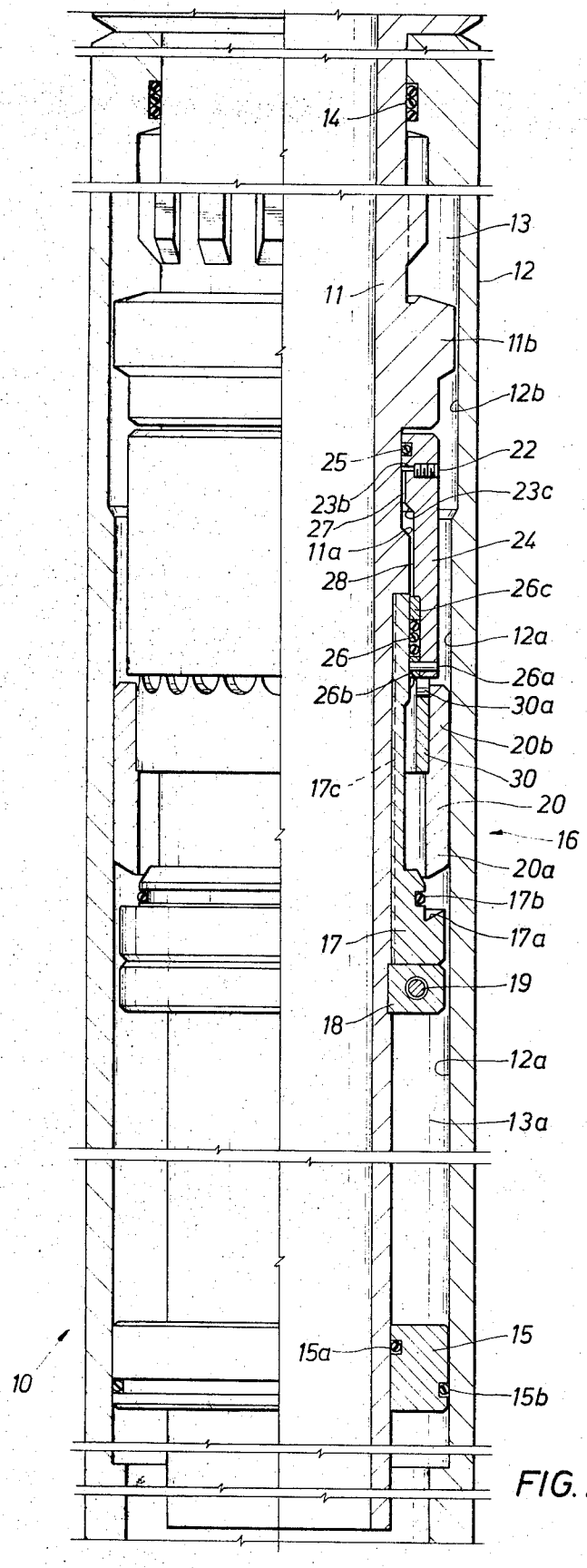


FIG. 1

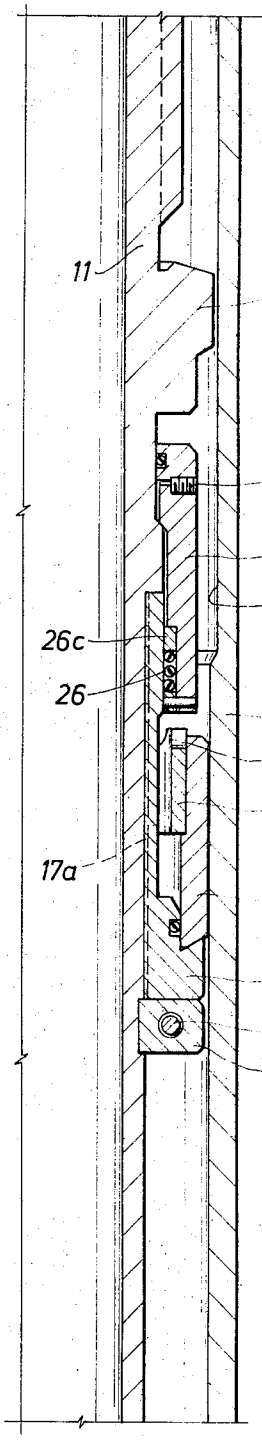


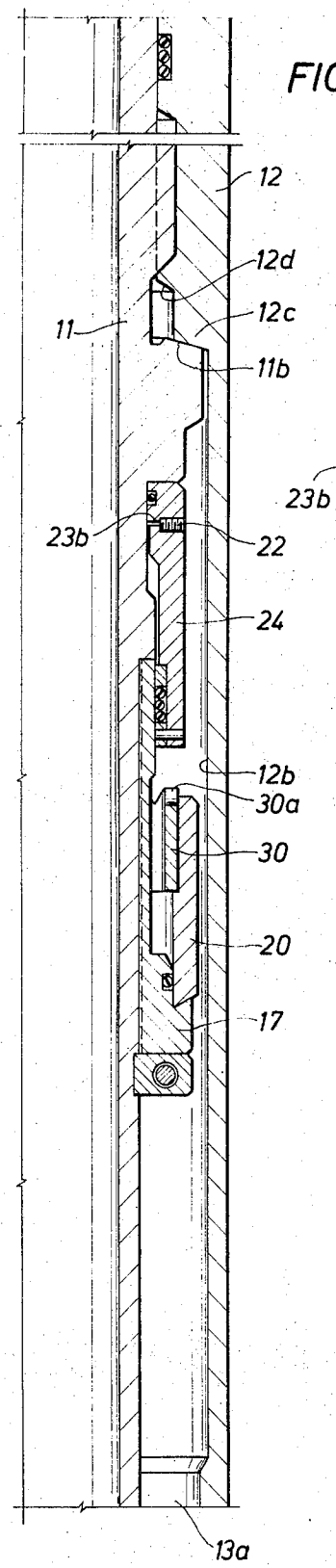
FIG. 2

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FIG. 3



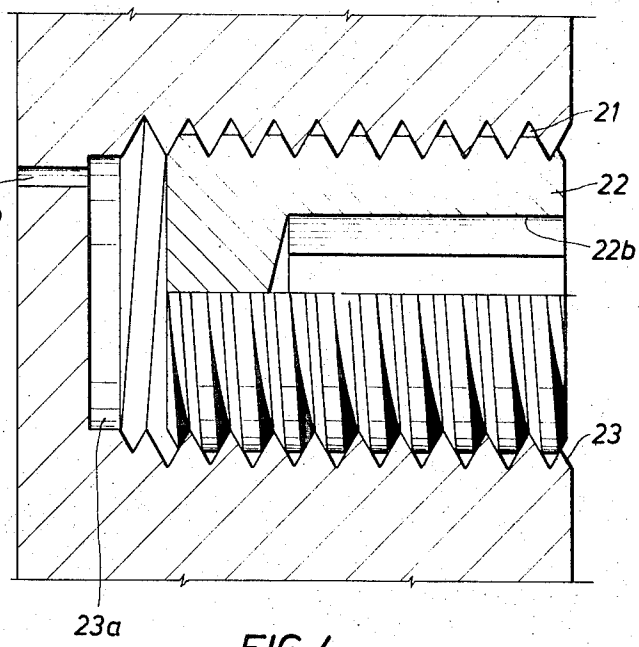


FIG. 4

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HYDRAULIC JARRING MECHANISM

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to means for exerting a sharp, high impact force blow on an object. More specifically, the present invention relates to a new and improved hydraulic jarring mechanism for imparting a jarring blow. In a specific application, the apparatus of the present invention relates to a new and improved hydraulic jarring mechanism for use in a petroleum well for delivering a controlled, jarring blow to an object lodged in the well structure.

2. Brief Description of the Prior Art

During the drilling or production of an oil or gas well, it is common for tools to become lodged in the well structure. One method generally employed to free such lodged device from the well is to latch onto the device and jar it upwardly by means of an hydraulic jar. Similar jarring forces are required for setting and retrieving a variety of tools commonly employed in oil and gas operations. In general terms, the hydraulic jar permits sudden release of a very strong tension exerted by a line extending from the well's surface to permit a sharp, jarring blow to be delivered to the lodged object.

In the typical hydraulic jar, the hydraulic fluid contained in the jar is slowly displaced from one reservoir portion to another reservoir portion, while an extremely large tension is developed through a line extending from the well surface. Metered flow of the hydraulic fluid from one portion of the reservoir to another provides a delay which permits extremely high tension force to be developed in the tubing or wire line. Once the jar components have moved to a certain position relative to each other, the back pressure on the hydraulic fluid is suddenly released to permit relatively unimpeded movement of the jar parts toward each other causing a hammer carried on one jar component to deliver a sharp, high intensity blow to an anvil carried on another relatively fixed jar component. The resulting blow is transmitted from the jar to the lodged device with which it is connected.

While devices of the foregoing type have been successfully used for a great number of years, many of such devices are unsatisfactory to the extent that the magnitudes of the jarring blows are not subject to precise control. In some cases, succeeding cycles produce jarring forces which exhibit relatively broad variations even in the same jarring device. Such variations are particularly evident where distendable compression sleeves are employed to provide both the fluid compression in the mechanism and the metering orifice for the bypass flow of the fluid. Prolonged use of such dual action sleeves eventually produces metal fatigue and wear which permits a wide variation in the extent of sleeve distension in response to the same fluid pressure particularly where the degree of distension is not confined by supporting structure.

A related shortcoming associated with employing distendable or distortable components as the sole source of regulation is that there is no simple way to vary the rate of metering orifice flow to in turn regulate the force of the jarring impact upon tripping of the tool.

SUMMARY OF THE INVENTION

The hydraulic jar of the present invention is equipped with a metering bypass flow passage which includes provision for changing both the length and the effective cross-sectional dimensions of the flow passage. Pressure responsive means are included in the present invention to automatically maintain a preestablished, adjustable pressure within the compression chamber of the reservoir to provide a controlled jarring blow which may be uniformly repeated in each succeeding cycle.

A cylindrical hammer equipped mandrel is telescopically received within a tubular anvil equipped barrel to form an annular fluid reservoir between the two components which may be filled with an hydraulic fluid. Axially spaced, sliding seals are included between the mandrel and barrel to maintain a continuous fluid seal as the mandrel and barrel are moved axially relative to each other. The mandrel carries a seat sleeve which is adapted to engage and seal with the base of a compression sleeve as the mandrel is moved upwardly relative to the barrel. A relatively thin-walled segment is formed along the upper portion of the compression sleeve whereby the sleeve extends radially into engagement with the barrel during a first portion of its upward compression stroke which tends to increase the pressure of the hydraulic fluid.

A small amount of the compressed fluid is displaced from the compression chamber by the upwardly moving compression sleeve. The displaced fluid flows through an annular flow passage having its inlet above the advancing sleeve and its outlet below the sleeve. The flow path is defined along its inner wall by the external surface of the mandrel. The external wall of the passage includes a pressure responsive, axially movable regulator sleeve having at its upper end a sliding seal engaged against the mandrel and at its lower end a sliding seal engaged against the external surface of the seat sleeve.

The sealing areas at the upper and lower portion of the regulator sleeve are dissimilar whereby pressure variations tend to move the sleeve axially causing an internal shoulder in the sleeve to engage and disengage an external shoulder formed on the mandrel to form a variable flow restriction.

The pressurized fluid above the compression sleeve enters into the annular space between the regulator sleeve and the mandrel through an adjustable, helical orifice formed between an externally threaded plug and a radial bore set within the sleeve. The peaks of the threads on the plug are flattened to form the helical orifice which can be changed in length by changing the amount of interconnected threads between the plug and bore. An axially extending bore is formed through a portion of the plug length to provide a relatively thin-walled segment which is responsive to changes in fluid pressure causing the plug threads to move radially and thereby vary the cross-sectional dimensions of the helical orifice.

The plug and sleeve are pressure responsive to automatically establish and maintain a predetermined pressure value in the fluid being compressed by the compression sleeve. Fluid entering the helical orifice in the high pressure areas flows between the mandrel and the regulator sleeve and through vertical grooves formed

between the mandrel and seat sleeve to exit in the low pressure area below the compression sleeve. The upper barrel portion includes a radially enlarged bore which disrupts the sealing engagement between the compression sleeve and the barrel wall to permit the mandrel to be moved relatively unimpeded until the mandrel hammer strikes the barrel anvil with a jarring blow. The force of the blow may be altered to any desired value by adjusting the length of the helical orifice.

It will be appreciated from the foregoing that the pressure responsive devices function automatically to maintain a predetermined pressure in the high pressure portion of the reservoir during the compression stroke of the jarring apparatus. By this means, the magnitude of the jarring blows remain consistent at any value which may be determined in advance by the positioning of the externally threaded plug.

The positioning of the metal plug within the receiving bore prevents the plug body from being distended beyond its elastic limits and thus ensures a relatively long effective lifetime. In addition, since the flow passage is varied automatically by the axial positioning of a slidable sleeve rather than by the distortion of the compression sleeve, the apparatus of the present invention is protected from damaging distortion to thereby extend the life of the device and ensure consistent functioning.

It is therefore a principal object of the present invention to provide an automatic regulating means which ensures maintenance of a constnat pressure in the reservoir of an hydraulic jar to provide a uniform, precalibrated impact force.

It is an additional object of the present invention to provide an automatically regulated flow passage which is effective in varying passage dimensions by moving components in the flow path relative to each other without distortion of the components.

It is a further object of the present invention to provide a new and improved plug type orifice meter which may be manually adjusted to vary the effective length of the orifice;

A still further object of the present invention is to provide a means for automatically varying the cross-sectional dimensions of an orifice in response to the pressure of the fluid flowing through the orifice.

The foregoing and other objects, features and advantages of the present invention will be more fully understood by reference to the following specification, drawings and the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a partial elevation, partially in section and partially broken away, illustrating the hydraulic jarring mechanism of the present invention before the initiation of the compression upstroke;

FIG. 2 is a quarter section similar to FIG. 1 illustrating the jarring mechanism near the top of the upstroke;

FIG. 3 is a vertical quarter section showing the jarring mechanism at the top of its upstroke; and

FIG. 4 is a partial section, on an enlarged scale, showing the variable orifice means of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

With reference to FIG. 1, the jarring mechanism of the present invention is indicated generally at **10**. The mechanism **10** includes a mandrel **11** which is telescopically received within a tubular barrel **12**. It will be understood that the upper portion of the mandrel **11** (not illustrated) is adapted to be secured to a suitable line, such as a tubing string or other suitable means, which extends from the mandrel to the well surface. The lower portion of the mandrel barrel (not illustrated) is adapted to be secured to an object which is lodged within the well structure.

The mandrel **11** and barrel **12** are radially spaced from each other to form a substantially annular reservoir **13**. The upper end of the reservoir **13** is sealed by means of annular O-rings **14** which are adapted to provide a sliding seal between the barrel **12** and the mandrel **11**. The lower portion of the reservoir **13** is sealed by an annular piston **15** having internal and external seal means **15***a* and **15***b*, respectively. The seal means carried by the piston **15** may be O-rings formed of rubber or other suitable material. It will be appreciated from the illustrated construction, that the piston **15** is movable axially with respect to both the mandrel **11** and the barrel **12** and functions to maintain a continuous sliding seal between the two components.

The reservoir **13** which is formed within the confines of the mandrel **11**, barrel **12**, seal means **14** and piston **15** is filled with a suitable hydraulic fluid which may be a high grade oil or other suitable fluid. A compression means indicated generally at **16** is disposed within the reservoir **13** and is adapted to increase the pressure of the reservoir fluid as the mandrel **11** is moved upwardly through a compression chamber **13***a* formed in the barrel **12**.

The compression means **16** includes an annular seat sleeve **17** which is mounted within a recessed portion of the mandrel **11**. The sleeve **17** is prevented from moving axially with respect to the mandrel by means of a split ring **18** which is held together by a bolt **19** or other suitable means. The seat sleeve **17** is provided with an annular seat **17***a* which is adapted to receive a lower portion **20***a* of a compression sleeve **20**. As more fully described hereinafter, when the mandrel **11** and attached sleeve **17** are moved upwardly with respect to the barrel **12**, the compression sleeve section **20***a* is seated in the seat sleeve **17***a* in the manner illustrated in FIG. 2. An annular O-ring **17***b* carried in the seat sleeve **17** is adapted to engage the compression sleeve **20** to provide a leakproof fluid seal between the two mated components.

During the upward movement of the mandrel **11**, seat sleeve **17** and seated compression sleeve **20**, the pressure of the fluid above the upwardly moving sleeve **20** increases causing an upper, thin-walled section **20***b* of the sleeve to distend radially outwardly into sealing engagement with the wall **12***a* of the compression chamber **13***a*. Continued upward movement of the sleeve **20** is permitted to proceed on a highly impeded basis by displacing the compressed fluid through a bypass flow passage which permits the fluid to flow downwardly through the reservoir where it exits below the compression sleeve.

With reference to FIG. 4, the initial portion of the bypass flow passage includes an adjustable length helical orifice **21** formed between an externally threaded plug **22** and an internally threaded bore **23**. The peaks of the threads formed externally of the plug **22** are flattened to provide radial spacing between the flattened thread surface of the plug and the valleys in the receiving bore **23**. The orifice **21** thereby advances helically along the flattened thread surfaces of the body **22** and exits into a base portion **23***a* formed in the bore **23**.

The internally threaded bore **23** is formed in a tubular regulator sleeve **24** which encircles and is axially movable with respect to the mandrel **11**. An annular, sliding seal **25** formed by a resilient O-ring or other suitable means is included along the upper portion of the regulator sleeve **24** to maintain a sliding seal between the sleeve and the mandrel. Spaced axially below the sleeve **25** is a second sliding seal **26** which is positioned at the lower end of the sleeve **24** and is designed to maintain a sliding seal between the sleeve and the upper external surface of the seat sleeve **17**. A set screw **26***a* secures an annular metal ring **26***b* to the regulator sleeve **24** to maintain the O-ring and an upper metal ring **26***c* in proper sealing position.

The bypass flow passage of the mechanism **10** includes the previously described helical orifice **21** and further includes a fixed radial orifice bore **23***b* which extends from the base **23***a* of the bore **23** to a first annular passage **27** formed between the internal surface of the sleeve **24** and the external surface of the mandrel **11**. The bypass is continued through a second annular passage section **28** formed between the sleeve and mandrel where it communicates across the top of the seat sleeve **17** with a plurality of axially extending, circumferentially spaced slots **17***c*. The slots **17***c* extend the entire axial length of the seat sleeve **17** and exit in the low pressure portion of the rservoir below the compression means **16**. From the foregoing, it may be seen that the displaced high pressure fluid may flow along the following route which comprises the bypass flow passage: helical orifice **21** to the base **23***a* of the bore **23**, to the radial orifice bore **23***b* to the annular passage **27**, to the second annular passage **28** and from there to the axially extending seat sleeve slots **17***c* where the fluid flows into the low pressure portion of the reservoir **13**.

In operation, the jarring mechanism is initially in the position illustrated in FIG. **1**. An upwardly directed movement is imparted to the mandrel **11** through the connecting line extending to the well head causing the mandrel to move upwardly with respect to the barrel **12** which is secured to an object lodged in the well structure. The initial movement of the mandrel and attached seat sleeve **17** engages the compression sleeve **20** drawing the lower sleeve portion **20***a* into sealing engagement with the seal sleeve **17** in the manner previously described. As the pressure in the chamber **13***a* above the upwardly moving sleeve increases, the upper portion of the sleeve **20***b* is distended radially outwardly into a sliding sealing engagement with the wall **12***a*.

The high pressure fluid above the upwardly moving compression sleeve **20** is displaced through the bypass flow passage along the course previously described. The restricted return passageway of the fluid establishes a back pressure which acts against the mandrel causing it to advance relatively slowly with respect to the barrel **12** as substantial upward forces are developed and exerted on the mandrel from the well surface. The force required to move the mandrel through the barrel at a given rate is regulated by the length of the helical orifice **21** which may be changed.

As previously indicated, the regulator sleeve **24** is movable axially in response to fluid pressure in the reservoir to automatically vary the restriction to fluid flow as required to maintain a predetermined pressure above the advancing compression sleeve **20**. The dimensions of the annular seal **25**, the seal **26** and the dimensions of an internal sleeve shoulder **23***c* and a mandrel shoulder **11***a* are preferably selected so that the sleeve **24** is moved automatically in response to pressure differentials between the compression chamber and the flow passage to draw the shoulders **11***a* and **23***c* into and out of engagement to thereby vary the restriction to fluid flow through the bypass passageway.

In the preferred form, the sealing dimensions of the seal **25** are less than those of the seal **26** which in turn are less than the seating surfaces of the shoulders **11***a* and **23***c*. During the initial portion of the upward stroke where fluid pressure in the compression is relatively low, the sleeve **14** is automatically forced downwardly to seat the shoulder **23***c* against the mandrel shoulder **11***a* causing a restriction to fluid flow in the bypass flow passage. When a predetermined pressure differential is developed between the increasing high pressure in the compression chamber and fluid flow passage, the regulator sleeve **24** automatically moves upwardly with respect to the mandrel to separate the two sealing shoulders. By this means, flow restriction is varied until the resultant forces acting on the sleeve **24** are equalized which produces a constant rate of fluid flow through the bypass flow passage.

When the mandrel **11** nears the upper portion of its stroke, the seal between the compression sleeve **20** and the barrel **12** is suddenly released at the point where an enlarged barrel bore **12***b* begins. The sudden release of back pressure on the compression assembly **16** and attached mandrel **11** permits the mandrel to move very rapidly upwardly until a hammer **11***b* carried on the mandrel strikes an anvil **12***c* on the barrel to deliver the desired jarring blow. The relative positions of the components of the jarring mechanism **10** at the instant of impact are illustrated in FIG. **3**. Inwardly extending barrel splines **12***d* mate with grooves formed along the mandrel **11** to maintain the desired circumferential positioning of the two members while permitting the desired relative axial movement between the two components.

After the jarring blow has been delivered, the mandrel **11** is lowered by releasing the tension on the line extending to the well's surface. As the mandrel moves downwardly through the barrel **12**, the compression sleeve **20** moves away from the seat sleeve **17** into the relative position illustrated in FIG. **1** of the drawings. Fluid flow from the lower portion of the reservoir **13** is permitted to bypass the downwardly moving compression means **16** by flowing between the compression sleeve and the seat sleeve. An annular ring **30** equipped with teeth **30***a* along its upper axial end provides a flow passage between the compression sleeve and the lower

portion of the regulator sleeve. When the mandrel **11** has been lowered to the beginning position, the foregoing procedure may be repeated to impart another jarring blow to the lodged object.

In addition to providing an adjustable length orifice, the plug **22** is equipped with a central bore **22***b* which extends along a porton of its axial length to render the plug pressure sensitive. This may best be seen by reference to FIG. **4**. By means of the illustrated construction, a relatively thin-walled portion is provided in the plug **22** which is moved radially inwardly and outwardly in response to fluid pressure. The radial movement of the thin-walled portion of the plug **22** varies the spacing between the flattened portion of the plug threads and the valleys in the receiving bore **23** to alter the cross-sectional dimensions of the helical orifice **21**.

From the foregoing, it may be seen that the lateral or cross-sectional dimensions of the helical orifice are automatically varied in response to pressure variations in the reservoir. It will be understood that while the plug **22** has been described as having flattened thread portions having a cross section which is substantially in the form of a truncated right triangle, the threads of the bore **23** may be flattened, if desired, to provide the helical flow passage. If the threads of both the bore **23** and the plug **22** are flattened, a dual helical orifice results.

The foregoing disclosure and description of the invention is illustrative and explanatory thereof, and various changes in the size, shape and materials as well as in the details of the appended claims may be made without departing from the spirit of the invention.

What is claimed is:

1. A jarring mechanism comprising:

a. first and second relatively movable operating means connected with each other;

b. a fluid-containing reservoir included with said first and second operating means;

c. compression means connected with said first and second operating means and said reservoir means for generating and maintaining a first substantially fixed pressure in a first portion of said fluid as said first and second operating means are moved relative to each other along a first portion of their relative travel, said first pressure resisting relative movement between said first and second operating means; and

d. release means connected with said first and second operating means and said reservoir means for reducing said first pressure to a second, lower pressure when said first and second operating means are moved along a second portion of their relative travel to reduce the resistance to relative movement between said first and second operating means whereby a jarring blow is delivered between said first and second operating means;

e. said compression means including control means for automatically regulating flow of said fluid from said first portion of said reservoir to a second portion of said reservoir for maintaining said first pressure at a substantially constant value;

f. said control means comprising variable flow passage means for automatically varying flow path dimensions in a flow passage extending between said first and second reservoir portions and including adjustable means for adjustably varying the length of said flow passage means.

2. A jarring mechanism as defined in claim **1** wherein said adjustable means includes pressure responsive wall means forming a first portion of said flow passage means for varying the cross-sectional area of said flow passage means in response to pressure changes in said fluid.

3. A jarring mechanism as defined in claim **2** wherein said adjustable means includes mating components comprising an externally threaded substantially cylindrical body received within an internally threaded sleeve bore with the peaks of the threads formed on at least one of said mating components spaced from the valleys in the other of said mating components to form at least one helical flow path between said mating components, said body being rotatable within said sleeve bore for moving said body axially with respect to said bore to vary the length of said helical flow path.

4. A jarring mechanism as defined in claim **3** wherein said pressure responsive wall means includes a bore extending axially through a threaded portion of said cylindrical body to form a tubular wall segment whereby pressure changes in said fluid move said tubular segment radially to vary the spacing between said thread peaks and valleys in said mating components.

5. A jarring mechanism as defined in claim **4** wherein said cylindrical body is provided with helical threads having a cross section substantially in the form of a truncated triangle.

6. A jarring mechanism comprising:

a. first and second relatively movable operating means connected with each other;

b. a fluid-containing reservoir included with said first and second operating means;

c. compression means connected with said first and second operating means and said reservoir means for generating and maintaining a first substantially fixed pressure in a first portion of said fluid as said first and second operating means are moved relative to each other along a first portion of their relative travel, said first pressure resisting relative movement between said first and second operating means;

d. release means connected with said first and second operating means and said reservoir means for reducing said first pressure to a second, lower pressure when said first and second operating means are moved along a second portion of their relative travel to reduce the resistance to relative movement between said first and second operating means whereby a jarring blow is delivered between said first and second operating means; and

e. control means for automatically regulating flow of said fluid from said first portion of said reservoir to a second portion of said reservoir for maintaining said first pressure at a substantially constant value, said control means including variable flow passage means for automatically varying flow path dimensions in a flow passage extending between said first and second reservoir portions;

f. said variable flow passage means including:

i. regulator sleeve means forming a second portion of said flow passage means;

ii. axially spaced first and second sliding seal means carried by said regulator sleeve means and exposed to said fluid in said first and second reservoir portions for moving said regulator

sleeve means axially in response to pressure differentials between said first and second reservoir portions; and

iii. restriction forming means included with said regulator sleeve means for varying the dimensions of said flow passage means as said regulator sleeve means is moved axially.

7. A jarring mechanism as defined in claim 6 wherein said regulator sleeve means includes adjustable means for adjustably varying the length of said flow passage means.

8. A jarring mechanism as defined in claim 7 wherein said adjustable means includes pressure responsive wall means forming a first portion of said flow passage means for varying the cross-sectional area of said flow passage means in response to pressure changes in said fluid.

9. A jarring mechanism as defined in claim 6 for imparting a jarring blow to objects lodged in a well wherein:

a. said first operating means includes substantially cylindrical mandrel means adapted to be secured to and moved axially by an axially movable operating line extending to the well surface;

b. said second operating means is adapted to be secured to an object lodged in said well and includes substantially tubular barrel means disposed about and radially spaced from a portion of said mandrel means;

c. said fluid containing reservoir means includes inner and outer radial side walls formed by said mandrel means and barrel means respectively;

d. said reservoir means further includes axially spaced, upper and lower end wall means having sliding seal means for maintaining a leakproof seal in said reservoir means while permitting relative motion between said first and second operating means; and

e. said sliding seal means in said lower wall means of said reservoir means includes an annular piston means disposed between and axially movable with respect to said mandrel means and said barrel means.

10. A jarring mechanism as defined in claim 9 wherein said compression means includes:

a. seat sleeve means carried by said mandrel;

b. axially movable compression sleeve means disposed about and adapted to be sealingly engaged by said seat sleeve means for movement relative to said mandrel means; and

c. radially distendable sleeve means included along one end portion of said compression sleeve means for distending radially into sealing engagement with said barrel means as said mandrel means is moved relative to said barrel means.

11. A jarring mechanism as defined in claim 10 wherein said variable flow passage means includes a flow path extending between annular shoulder means formed internally of said regulator sleeve means and annular shoulder means carried externally of said mandrel means whereby pressure induced, axial movement of said regulator sleeve means with respect to said mandrel means automatically moves said shoulder means into and out of engagement with each other to vary fluid flow between said shoulder means for maintaining said first pressure at substantially uniform value.

12. A jarring mechanism as defined in claim 11 wherein said variable flow passage means includes adjustable means for adjustably varying the length of said flow passage means.

13. A jarring mechanism as defined in claim 12 wherein said adjustable means includes pressure responsive wall means forming a first portion of said flow passage means for varying the cross-sectional area of said flow passage means in response to pressure changes in said fluid.

14. A jarring mechanism as defined in claim 13 wherein said adjustable means includes mating components comprising an externally threaded substantially cylindrical body received within an internally threaded regulator sleeve bore with the peaks of the threads formed on at least one of said mating components spaced from the valleys in the other of said mating components to form at least one helical flow path between said mating components, said body being rotatable within said sleeve bore for moving said body axially with respect to said sleeve bore to vary the length of said helical flow path.

15. A jarring mechanism as defined in claim 14 wherein said pressure responsive wall means includes a bore extending axially through a threaded portion of said cylindrical body to form a tubular wall segment whereby pressure changes in said fluid move said tubular segment radially to vary the spacing between said thread peaks and valleys in said mating components.

16. A jarring mechanism comprising:

a. first and second relatively movable operating means connected with each other;

b. a fluid-containing reservoir included with said first and second operating means;

c. compression means connected with said first and second operating means and said reservoir means for generating and maintaining a first substantially fixed pressure in a first portion of said fluid as said first and second operating means are moved relative to each other along a first portion of their relative travel, said first pressure resisting relative movement between said first and second operating means; and

d. release means connected with said first and second operating means and said reservoir means for reducing said first pressure to a second, lower pressure when said first and second operating means are moved along a second portion of their relative travel to reduce the resistance to relative movement between said first and second operating means whereby a jarring blow is delivered between said first and second operating means;

e. said compression means including control means for automatically regulating flow of said fluid from said first portion of said reservoir to a second portion of said reservoir for maintaining said first pressure at a substantially constant value, operation of said control means being solely dependent on differential pressure between said first and second reservoir portions.

17. A jarring mechanism as defined in claim 16 wherein said control means includes variable flow passage means for automatically varying flow path dimensions in a flow passage extending between said first and second reservoir portions.

18. A jarring mechanism as defined in claim 17 wherein said variable flow passage means includes adjustable means for adjustably varying the length of said flow passage means.

19. A jarring mechanism as defined in claim 18 wherein said adjustable means includes pressure responsive wall means forming a first portion of said flow passage means for varying the cross-sectional area of said flow passage means in response to pressure changes in said fluid.

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