July 31, 1951 E. O. LOWE 2,562,321

TORQUE TYPE WELL JAR

Filed Dec. 12, 1947

Fig. 1.

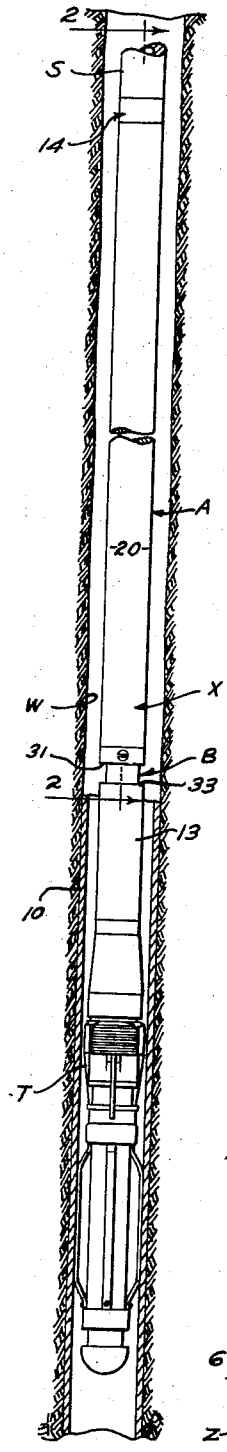


Fig. 2.

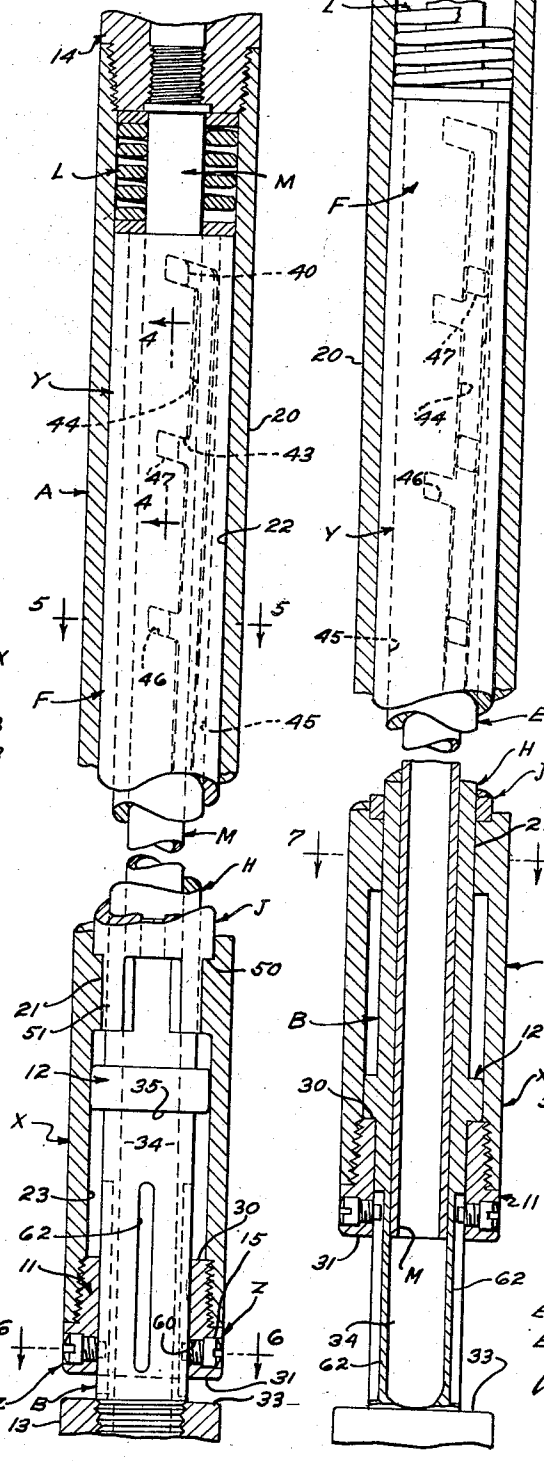


Fig. 3.

Fig. 4.

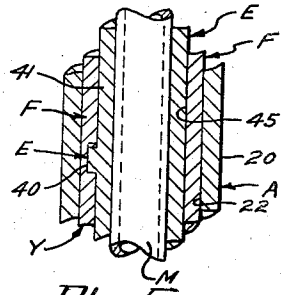


Fig. 5.

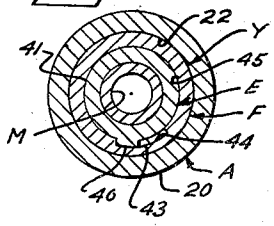


Fig. 6.

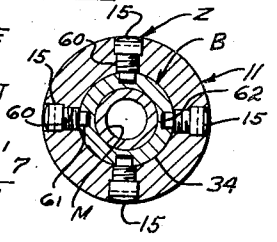
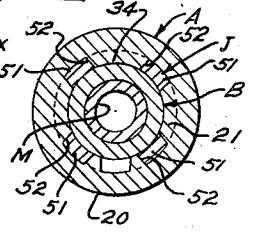


Fig. 7.



INVENTOR
ELMO O. LOWE
BY
ATTORNEY

Patented July 31, 1951

2,562,321

UNITED STATES PATENT OFFICE

2,562,321

TORQUE TYPE WELL JAR

Elmo O. Lowe, Los Angeles, Calif.

Application December 12, 1947, Serial No. 791,263

16 Claims. (Cl. 255—27)

1

This invention relates to a torque type well jar and it is a general object of the invention to provide such a jar of simple, practical construction wherein the action of the jar is controlled by a torsional member and that member is confined to the jar itself.

Torque type or torque controlled jars have been used in wells for the removal of lost or stuck objects known as fish. The usual jar of this type involves hammer parts controlled by a releasable latch, the action of the latch being controlled by torque set up in the operating string that extends to the top of the well. With this arrangement or type of jar, it is necessary to employ a string of pipe, or the like, as an operating string and the operating string is subjected to longitudinal strain in order to actuate the hammer parts and is subjected to torsional strains for the operation of the control in the jar.

It is a general object of the present invention to provide a jar in which the latch means is controlled by torque confined to the jar itself, with the result that the operating member or operating string need only communicate longitudinal strain to the jar. As a result of the construction provided by the present invention the operating string may be wholly free of torque and it may, if desired, be merely an operating line or cable, since it is unnecessary to communicate torque through the operating string.

Another object of the present invention is to provide a jar of the general character referred to wherein a control means is provided whereby the torque applied to the latch may be varied, with the result that the jar will release under a given tensile strain. By the construction of the present invention the jar may be preset as to torque and, consequently, as to the strain at which it will release, so that it has a known or given releasing action in the well and the action of the jar is not subject to variations, such as occur in the case of jars requiring that the controlling torque be communicated from the top of the well to the jar through the operating string.

Another object of the present invention is to provide a jar of the general character referred to involving a simple, practical, dependable arrangement and combination of parts easily manufactured and simple to service.

Another object of the present invention is to provide a jar of the general character referred to wherein there are but few simple parts such that they can be readily and inexpensively manufactured and such as to be easily and quickly assembled.

2

The various objects and features of my invention will be fully understood from the following detailed description of a typical preferred form and application of the invention, throughout which description reference is made to the accompanying drawings, in which:

Fig. 1 is a sectional view of a well showing an object or fish lodged therein and showing an operating string carrying a jar embodying the present invention, which jar is coupled to the fish by a suitable fishing tool. Fig. 2 is an enlarged longitudinal view of the jar with various parts broken away to be shown in section in order to illustrate the construction of the jar, the jar being shown in the normal or unactuated position in which case the latch mechanism is engaged. Fig. 3 is a view similar to Fig. 2, showing the parts in an actuated position where the latch mechanism has been released and the hammer parts engaged. Fig. 4 is a detailed sectional view taken as indicated by line 4—4 on Fig. 2. Fig. 5 is a transverse sectional view taken as indicated by line 5—5 on Fig. 2. Fig. 6 is a transverse sectional view taken as indicated by line 6—6 on Fig. 2, and Fig. 7 is a transverse sectional view taken as indicated by line 7—7 on Fig. 3.

The jar provided by the present invention is intended, primarily, for use in wells such as oil wells when it is desired to dislodge a stuck object or part, such for example as a stuck pipe 10. In practice the jar of the present invention can be operated on or through an operating string S through which tensile strain can be applied. In the particular case illustrated in the drawings the string S is shown as a tubular string, say for example, a string of drill pipe, or the like. However, it will be apparent from the following description that the string may be a mere cable or line.

In practice the jar of the present invention may be joined or coupled to the object to be jarred through any suitable connection or coupling. It is customary to couple a jar to a stuck object through a device known as a fishing tool and in the drawings I have illustrated the jar coupled to the stuck pipe 10 by means of a typical fishing tool T. The tool T illustrated is of a type generally controlled through rotation, this type of tool being practical for use when the operating string S is a string of pipe through which rotation can be imparted to the tool T. It will be apparent that should a line or cable be used as the string S the tool T or coupling between the jar and stuck object 10 will be one that does not require rotation for operation or setting.

The jar embodying the present invention involves, generally, a hammer mechanism X, a control means Y for the hammer mechanism, and adjusting means Z operable to vary the action of the control means.

In general, the hammer mechanism X involves two telescopically related sections, one a shell A, the other a mandrel B. The shell and mandrel have striking parts, for instance, the shell is provided with a hammer head 11 while the mandrel is provided with an anvil part 12. The hammer sections A and B are related or coupled to form a unitary tool that is sturdy and rigid in construction and in the particular case illustrated the mandrel B depends from the shell section and is provided with a coupling part 13 by which connection is made with the fishing tool T. The upper end of the shell section A is provided with a coupling 14 by which connection is made with the lower end of the operating string S.

The control means Y for the hammer mechanism is a releasable latch or lock mechanism acting between sections A and B and normally releasably latching the hammer sections cocked or in position where the hammer-head 11 is spaced from the anvil B and releasable upon application of predetermined tension to the tool to free the hammer mechanism so that the head 11 strikes the anvil 12.

The control means in the preferred form illustrated in the drawings involves, generally, a lock element E and a keeper F, and it further includes engaging means for the elements E and F normally yieldingly maintaining the elements E and F in the locked or engaged position. In accordance with the present invention the engaging means of the control is a torsional means involving one or more resilient elements acting under torsional strain. In the form of the invention illustrated the engaging means involves two torsional or resilient elements in the form of stems, there being a stem H coupling the lock element E with the mandrel so that these parts are spaced apart longitudinally of the tool and have longitudinal strain communicated from one to the other, and a stem J coupling the keeper element with the shell A so the keeper is positioned to cooperate with the lock element. In the form of construction illustrated the lock element E is integral with the stem H while the keeper F is integral with stem J.

The adjusting means for the latch mechanism above referred to is operable to vary the strain or torque established in the engaging means, and more specifically it is operable to vary the torque set up in the stems H and J. In the form of the invention illustrated the means Z includes one or more holders 15 carried by the shell A and engaging the mandrel B holding the shell and mandrel against relative rotation with the stems H and J under the desired torque, while the shell and mandrel are free to reciprocate relative to each other.

In the particular form of the invention illustrated a construction is shown that may be operated to strike downwardly as well as upwardly, and a spring L is incorporated in the mechanism to normally yieldingly hold the shell and mandrel in the unactuated position shown in Fig. 2. When a spring L is incorporated, as is shown in the drawings, the mechanism may further include a wash pipe M.

The shell A of the hammer mechanism is the outer element of the hammer mechanism and involves, generally, an elongate tubular body 20,

the coupler 14 at the upper end of the body 20 and the head 11 at the lower end of the body 20. The body 20 is provided intermediate its ends with an internal stem support 21 and with a bore 22 extending into it from its upper end and terminating at the support 21 and with a bore 23 extending into it from its lower end and terminating at the support 21. The bore 22 is such as to slidably receive the keeper element F and the stem J on which the keeper occurs while the bore 23 is such as to slidably receive the anvil 12 on mandrel section B.

The coupler 14 is shown threaded to the upper end of the body 20 confining parts of the control means and also the spring L within the mechanism and carrying the wash pipe M when such pipe is employed. The coupler 14 serves primarily as a suitable or convenient means of connection between the body 20 and the string S and in practice may vary widely in form, type and construction, depending upon the particular operating string to be coupled with the jar.

The head 11 at the lower end of the body 20 is a striker head having an upper striking face 30 at its upper end and a lower striking face 31 at its lower end. The upper striking face 30 is opposed to the anvil 12 and engages the anvil when the jar is operated from the position shown in Fig. 2 to that shown in Fig. 3. The lower striking face 31 is provided when the jar is constructed to strike downwardly, and is operable from the position shown in Fig. 2 to a position where it strikes the top 33 of the coupler 13 of the mandrel B. In the particular case illustrated the head 11 is shown threaded to the lower end of the body 20.

The mandrel B is the inner element of the hammer mechanism and is characterized by an elongate shank 34 entering the lower end portion of the body 20 through the striker head 11. The shank terminates at its upper end in the anvil 12 which is in the nature of an enlargement on the upper end of the shank 34, the anvil being formed with a lower face 35 that cooperates with the face 30 of the striker head. The coupler 13 of the mandrel B is joined, for instance screw threaded, to the lower end of the shank 34, and depends therefrom to make connection with the fishing tool T. In practice the coupler 13 may be varied as desired to accommodate the particular tool T required to engage the stuck object 10.

The control means Y is formed of parts or elements separate from the sections of the hammer mechanism and assembled within the hammer mechanism preferably in the upper end portion thereof. The lock element E of the control means Y involves or is made up of one or more lugs 40 on a suitable support 41. The support 41 shown in the drawings is a tubular part in the nature of a continuation or extension of the torque stem H, it being preferred that the support 41 be integral with the stem H in which case it may be considered a part or portion thereof. The lugs 40 are provided on or project from the exterior of the support 41 and in the preferred arrangement they are longitudinally spaced in a row at one side of the support 41. In practice the number, form and construction of the lugs may vary as circumstances require. In the case shown the lugs are integral with the support 41 so the stem H, support 41 and lugs 40 form a single integral or continuous unit that may be considered as one part of the mechanism.

The keeper element F of the control means is, in the case illustrated, an elongate tubular part in the nature of a continuation or extension of the stem J and when thus formed it may be considered as a unit with stem J. The keeper is characterized by recesses 43 that receive the lugs 40 and by a channel 44 that receives the lugs when they are disengaged from the recesses. In the particular case illustrated the recesses are shown formed in the keeper from the inner wall 45 thereof, and the channel 44 is shown extending lengthwise of the keeper with the several recesses communicating with the single channel. When the control means is located in the body 20 of the hammer mechanism as shown throughout the drawings the keeper F is slidably supported in the bore 22 of the body 20 while the support 41 is slidably supported within the keeper F, all as clearly illustrated in Fig. 4 of the drawings.

The lugs 40 of the lug element are normally engaged in the recesses 43 of the keeper, the lugs and recesses being related so that they tend to become disengaged upon longitudinal force being applied to the control means tending to move the lug element in one direction and the keeper in the other direction. In the particular case illustrated the lug element being anchored to the mandrel, which in turn is anchored to the lodged part 10, will normally remain stationary while upward strain communicated from the string S to the keeper F through the body 20, support 21, and the stem J tends to move the keeper F up, relative to the lug element.

In the construction illustrated the lower walls 46 of the recesses engage the lower walls 47 of the lugs and these engaged or cooperating walls are inclined or pitched, as shown in the drawings, so that when upward strain is applied to the keeper F force is set up tending to move the lugs out of the recesses. This force or tendency for the lugs to be disengaged from the recesses is resisted by the torque set up in or maintained in the stems H and J. It will be apparent that if sufficient longitudinal strain is applied to the keeper the resulting force will be sufficient to overcome the torque in the stems H and J, with the result that the lugs move out of the recesses 43 and enter the channel 44, whereupon the lug and keeper elements of the control means are released to move freely relative to each other longitudinally of the mechanism.

The torsional elements or stems H and J extend longitudinally of the tool and are slidably engaged one within the other, the stem H being slidable within the stem J.

The stem J which is the outermost stem is tubular in form and is joined or coupled to the keeper F as hereinabove described. The stem J extends a substantial distance within the body 20, and its lower end is engaged with the support 21 in the body 20. The stem J is fitted in the bore 22 with working clearance while its lower end 50 rests on or bears against the upper end of support 21. The fit of the stem J in the bore 22 allows the stem to shift longitudinally in the bore and to turn therein. In accordance with the form of the invention under consideration the stem J is keyed to the support 21 so that the lower end of the stem is held against rotation relative to the body 20. The engagement or connection between the stem J and the support 21 is preferably such as to allow the support 21 to move downward relative to the stem when it is desired to move the striker head 11 into engagement with the coupler 13. In the construction illustrated a plurality of longitudinally disposed circumferentially spaced lugs 51 depend from the stem J and are slidably engaged in guideways or key slots 52 in the support 21.

The stem H is the inner stem of the control means and is preferably a tubular part slidably engaged in the stem J. In the preferred form of the invention the lower end of the stem H is joined or coupled at the upper end of the mandrel B, in fact, it is preferably integrally joined thereto while the support 41 of lug element E is preferably an integral continuation of the upper end of the stem as hereinabove described.

With the lower end of the stem J coupled to the body 20 at the coupler 21 against rotation relative to the body, and with the lower end of stem H coupled to the upper end of the mandrel B against rotation relative thereto, and with the control Y coupling the upper ends of the stems, as above described, it will be apparent that relative rotation between the two sections of the hammer mechanism, that is, between the sections A and B, will twist or set up torsional strain in the stems H and J.

It is preferred to construct the stems H and J so that some deflection occurs in both of the stems. In fact, the structure may be made such that about equal deflection occurs in the two stems.

The adjusting means Z acts to set the lower end portion of the stems H and J against relative rotation and will hold them against relative rotation when they have been rotated to a position establishing them under the desired torsional strain. When the stems H and J are related to the shell and mandrel sections of the hammer mechanism, as above described, it is preferred to apply the means Z to or incorporate it in the lower end portion of the hammer mechanism, for instance at the point where the mandrel extends through the striker head of the shell section.

In the particular case illustrated the means Z is shown as involving a plurality of circumferentially spaced holders 15 which are members threaded into radial openings 60 in the striker head and having inner ends 61 which extend into longitudinal slots 62 in the exterior of the mandrel shank 34. When this form of adjusting means is employed it is a simple matter to rotate the mandrel section B of the hammer mechanism relative to the shell section A until the desired torsional strains have been set up in the stems H and J, whereupon the holders 15 are installed so that their ends 61 enter the longitudinal channels 62 in the shank of the mandrel. The mechanism is then set with a fixed or predetermined torque in the stems H and J and yet the hammer sections are free to move longitudinally relative to each other.

When it is desired to form the mechanism so that it can be operated to strike downwardly provision is made for moving the shell section A down from the normal position shown in Fig. 1 to a position where the lower face 31 of the striker 11 engages the top face 33 of coupler 13 of mandrel B. To gain such relative movement of the hammer sections the stem support 21 is located in body 20 far enough above the anvil 12 to allow the stem support to move downward or toward the anvil without striking it before the striker 11 engages the coupler 13. The sliding engagement provided between the stem J and its support 21 allows the support 21 to move

away from the stem J when a downward blow is struck.

In the form of the mechanism illustrated the spring L is located in the upper end portion of body 20 between the coupler 14 in the upper ends of the stems H and J. The spring normally yieldingly maintains the parts in the positions shown in Fig. 2 and is such as to compress enough to allow the striker head to move downwardly into engagement with the coupler 13.

When a spring L is incorporated in the mechanism it is desirable to employ a wash pipe to prevent foreign matter from lodging in the spring. In the drawings I have shown a wash pipe M carried by the coupler 14 and extending downwardly through the spring L and into the inner stem H so that circulating fluid that may be introduced through the tool will pass thereto without reaching the spring L.

From the foregoing description it will be apparent how, through my present construction, the lug element and keeper of the control means Y may be designed and proportioned to release upon the application of force tending to move the keeper and lug element relative to each other longitudinally of the tool. It further will be apparent that torque set up and maintained in the stems H and J will normally yieldingly hold the lugs of the lug element in cooperative engagement with the recesses of the keeper and when the lugs are thus engaged in the keeper the control means holds the hammer sections A and B in the unactuated position shown in Fig. 2.

To actuate the jar in order to strike an upward blow, upward strain is applied through the operating string tending to move the hammer section A up relative to the section B. Such movement is prevented or resisted by the control means due to the engagement of the lugs in the recesses of the keeper. When a sufficient upward strain is thus exerted the torque of the stems H and J, maintaining the lugs in the recesses, is overcome and the lugs move out of the recesses and enter the channel 44. When this occurs the control means is released, freeing the two sections of the hammer mechanism so that the section A moves freely upward relative to the mandrel section B, allowing the head 11 to strike the anvil 12. It is to be understood that the several lugs and recesses are so related as to cause the several lugs to simultaneously leave their respective recesses.

When the desired blow has been struck the section A is lowered relative to the section B with the result that the lugs are moved through the channel 44 until they come opposite the recesses. When the lugs come opposite the recesses they immediately enter the recesses through the torsional action of the stems H and J, readying the tool for another operation. Through the construction of the present invention the desired torque is set up in the stems H and J through the setting of the means Z, as hereinabove described, and that torque will be maintained in the tool itself requiring no additional operation or manipulation of the tool through the operating string or any other medium.

Having described only a typical preferred form and application of my invention, I do not wish to be limited or restricted to the specific details herein set forth, but wish to reserve to myself any variations or modifications that may appear to those skilled in the art and fall within the scope of the following claims:

Having described my invention, I claim:

1. A jar of the character described including, a tubular body having a striking head at its lower end, an internal stem support above the head and a coupler at its upper end, a mandrel entering the body through the head and carrying an anvil at its upper end between the head and support and having a coupler below the head, a tubular outer torque stem in the body slidably keyed to the support to reciprocate relative thereto and projecting freely upward therefrom, an inner tubular torque stem in the outer torque stem and anchored to the upper end of the mandrel and projecting freely upward therefrom, latch members carried by the upper ends of the stems and having cooperating inclined latch surfaces, and a releasable holder slidably coupling the head and mandrel with torsional strain in the torque stems.

2. A jar of the character described including, a tubular body having a striking head at its lower end, an internal stem support spaced above the head and a coupler at its upper end, a mandrel entering the body through the head and carrying an anvil at its upper end between the head and support and having a coupler below the head, a tubular outer torque stem in the body slidably keyed to the support to reciprocate relative thereto and projecting freely upward therefrom, an inner tubular torque stem in the outer torque stem and anchored to the upper end of the mandrel and projecting freely upward therefrom, latch members carried by the upper ends of the stems and having cooperating inclined latch surfaces, a spring under compression between the coupler at the upper end of the body and the latch member carried by the outer torque stem, and a releasable holder slidably coupling the head and mandrel with torsional strain in the torque stems.

3. A jar of the character described including, a tubular body having a striking head at its lower end, an internal stem support above the head and a coupler at its upper end, a mandrel entering the body through the head and carrying an anvil on its upper end between the head and support and having a coupler below the head, a tubular outer torque stem in the body slidably keyed to the support to reciprocate relative thereto and projecting freely upward therefrom, an inner tubular torque stem in the outer torque stem and anchored to the upper end of the mandrel, latch members carried by the upper ends of the stems and having cooperating inclined latch surfaces, a spring under compression between the coupler at the upper end of the body and the latch member carried by the outer torque stem, a wash pipe depending from the coupler at the upper end of the body through the spring and into the inner torque stem, and a releasable holder slidably coupling the head and mandrel with torsional strain in the torque stems.

4. A well jar for use between a fishing tool and an operating string including, two relatively movable hammer sections with cooperating hammer faces, one including a tubular body portion and the other a mandrel within said body portion, and a control means coupled with the hammer sections and normally releasably holding the hammer sections in an unactuated position where the hammer faces are apart and including, cooperating latch members shiftable relative to each other and disengaged by tension communicated from the hammer sections, and elements connecting the latch members and hammer sections, one of said elements being an elongate tubular torque

member within said body portion and surrounding the mandrel, the said torque member being held at one end and being otherwise free and normally yieldingly holding one of the latch members engaged with the other latch member.

5. A well jar for use between a fishing tool and an operating string including, two relatively movable hammer sections with cooperating hammer faces, one including a tubular body portion and the other a mandrel within said body portion, and control means coupled with the hammer sections and normally releasably holding the hammer sections in an unactuated position where the hammer faces are apart and including, cooperating latch members and parts connecting the latch members and hammer sections, the latch members being shiftable relative to each other and disengaged by force exerted longitudinally of the jar and communicated from the hammer sections through said parts, the part joined to one of the latch members being carried by the mandrel, and the other of said parts being an elongate tubular torque member within said body portion and surrounding the mandrel, said torque member being held at one end and carrying the other latch member and normally yieldingly holding the latch members engaged with each other, and means operable to vary the action of the torque member and thereby effect presetting of the jar.

6. A well jar for use between a fishing tool and an operating string including, two relatively movable hammer sections with cooperating hammer faces, one including a tubular body portion and the other a mandrel within said body portion, and control means normally releasably holding the hammer sections in an unactuated position where the said faces are apart and including, cooperating latch members shiftable relative to each other and parts connecting the latch members and hammer sections, the latch members being disengaged by force exerted longitudinally of the jar and communicated from the hammer sections to the latch members through said parts, one of said parts being an extension of the mandrel and carrying one of the latch members, and the other of said parts being an elongate tubular torque member within the body portion and surrounding the mandrel and anchored at one end only where it is secured to said body portion, said torque member carrying the other latch member and normally yieldingly holding the latch members engaged.

7. A well jar for use between a fishing tool and an operating string including, two relatively movable hammer sections with cooperating hammer faces, one including a tubular body portion and the other a mandrel within said body portion, and control means normally releasably holding the hammer sections in an unactuated position where the said faces are apart and including, cooperating latch members shiftable relative to each other and disengaged by force exerted longitudinally of the jar, and two elongate tubular torque members communicating longitudinal force in the jar, the torque members being located within the body portion and each having a latch member thereon and being anchored to one of the hammer sections, said torque members normally yieldingly holding the latch members in latching engagement.

8. A well jar for use between a fishing tool and an operating string including, two relatively movable hammer sections with cooperating hammer faces, one including a tubular body portion and the other a mandrel within said body portion, and control means normally releasably holding the hammer sections in an unactuated position where the said faces are apart and including, cooperating latch members shiftable relative to each other and disengaged by force exerted longitudinally of the jar, and two elongate tubular torque members communicating longitudinal force in the jar, the torque members being located one within the other and both within the said body portion, each torque member having a latch member fixed thereon and being anchored at one end to a hammer section, the torque members being normally under torsional strain in opposite directions urging the latch members to latching engagement.

9. A well jar for use between a fishing tool and an operating string including, two relatively movable hammer sections with cooperating hammer faces, one including a tubular body portion and the other a mandrel within said body portion, latch members adapted to rotate relative to each other and having cooperating inclined faces, and telescopically related tubular torque members having free end portions, the latch members being fixed on said free end portions of the torque members, one torque member having an anchored end secured to the body portion and the other torque member having an anchored end secured to the mandrel, the torque members being under torsional strain in opposite directions yieldingly holding the latch members in cooperative engagement with the hammer faces apart.

10. A well jar for use between a fishing tool and an operating string including, two relatively movable hammer sections with cooperating hammer faces, one including a tubular body portion and the other a mandrel within said body portion, latch members adapted to rotate relative to each other and having cooperating inclined faces, two elongate tubular telescopically related torque members anchored to the hammer sections and each having one of the latch members located thereon as a part thereof, the torque members being under torsional strain in opposite directions yieldingly holding the latch members in cooperative engagement with the hammer faces apart, and means operable to preset one of the torque members relative to its supporting hammer section to predetermine the force with which the latch members are engaged.

11. A well jar operable between a fishing tool and an operating string including, a hammer mechanism including hammer sections keyed together to reciprocate relative to each other, one including a tubular body portion and the other a mandrel within said body portion, two telescopically related elongate tubular torque members forming an elongate assembly within the said body portion, cooperating latch elements at one end of the assembly and rigid with the torque members where the torque members are free to turn relative to each other, the latch elements releasably coupling the torque members against relative longitudinal movement, and connections between the torque members and the hammer sections at the other end of the assembly anchoring one of the torque members to one of the hammer sections against rotation relative thereto and anchoring the other torque member to the other hammer section against rotation relative thereto, one of the connections being variable to vary torque holding the latch elements engaged.

12. A well jar operable between a fishing tool and an operating string including, a hammer

mechanism including hammer sections keyed together to reciprocate relative to each other, one including a tubular body portion and the other a mandrel within said body portion, two telescopically related elongate tubular torque members forming an elongate assembly within the said body portion, cooperating latch elements at one end of the assembly and rigid with the torque members where both torque members are free to turn relatively to each other, the latch elements releasably coupling the torque members against relative longitudinal movement, and connections between the torque members and the hammer sections at the other end of the assembly anchoring the assembly to the hammer mechanism against rotation of the torque members relative to the hammer sections, one of the connections providing free relative movement between the hammer sections in one direction longitudinally of the jar from an unactuated position.

13. A well jar operable between a fishing tool and an operating string including, a hammer mechanism including relatively movable hammer sections keyed together to reciprocate relative to each other, one including a tubular body portion and the other a mandrel within said body portion, two telescopically related elongate tubular torque members forming an elongate assembly within the said body portion, latch elements integral with the torque members and releasably coupling the torque members at one end of the assembly where both torque members are free, and connections between the other ends of the torque members and the hammer sections anchoring the torque members to the hammer mechanism so the torque members are there held against relative rotation, one of the torque members being shiftable longitudinally of the hammer section to which it is anchored allowing free relative movement between the hammer sections in one direction longitudinally of the jar from an unactuated position and the other connection being variable to vary torque normally holding the latch elements engaged.

14. A well jar operable between a fishing tool and an operating string including, a hammer mechanism including relatively movable hammer sections keyed together to reciprocate relative to each other, one having a tubular body portion and the other a mandrel entering the lower end of said body portion, two telescopically related tubular torque members forming an elongate assembly within the body portion, latch elements

integral with the torque members releasably coupling the torque members at the upper end portion of the assembly, and connections between the lower ends of the torque members and the hammer sections by which the torque members are then held against relative rotation.

15. A jar of the character described including, a tubular body having a striking head at its lower end, a mandrel entering the body through the head and carrying an anvil at its upper end and within the body engageable by the head, means keying the body and mandrel together against relative rotation, a tubular torque member anchored against rotation in the body at a point above the anvil and projecting freely upward therefrom, a second torque member anchored against rotation to the upper end of the mandrel and extending freely upwardly through the tubular torque member, and cooperating latch members integral with the upper ends of the torque members releasably holding the torque members against relative longitudinal movement.

16. A jar of the character described including, a tubular body having a striking head at its lower end, a mandrel entering the body through the head and carrying an anvil at its upper end and within the body engageable by the head, a tubular torque member anchored against rotation in the body at a point above the anvil and projecting freely upward therefrom, a second torque member anchored against rotation to the upper end of the mandrel and extending freely upwardly through the tubular torque member, torsionally engaged latch members fixed relative to the upper ends of the torque members releasably holding the torque members against relative longitudinal movement, and means coupling the body and mandrel for reciprocation relative to each other while holding the torque members under torsional strain applied to the latch members.

ELMO O. LOWE.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,056,496	White	Oct. 6, 1936
2,065,262	Barkelew et al.	Dec. 22, 1936
2,101,968	Wickersham	Dec. 14, 1937