Dec. 16, 1952 G. E. JUSTICE ET AL 2,621,960

PRESSURE TYPE RELEASING WASHOVER OVERSHOT

Filed Nov. 22, 1946 2 SHEETS—SHEET 1

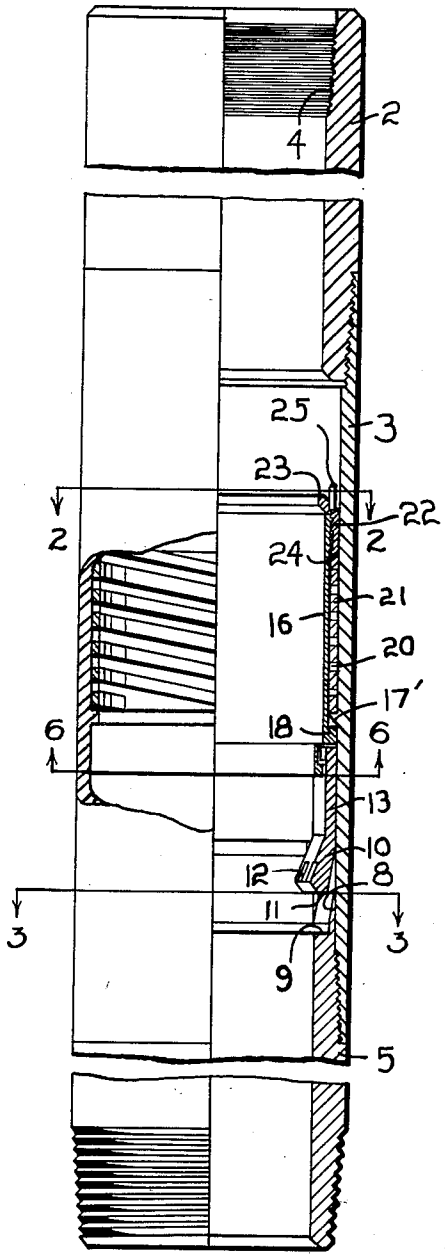

Fig. 1

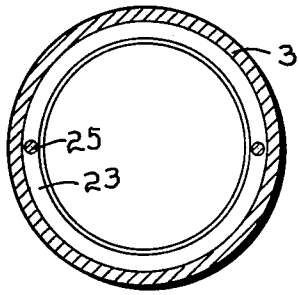

Fig. 2

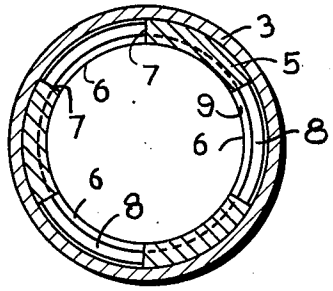

Fig. 3

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PRESSURE TYPE RELEASING WASHOVER OVERSHOT

Filed Nov. 22, 1946 2 SHEETS—SHEET 2

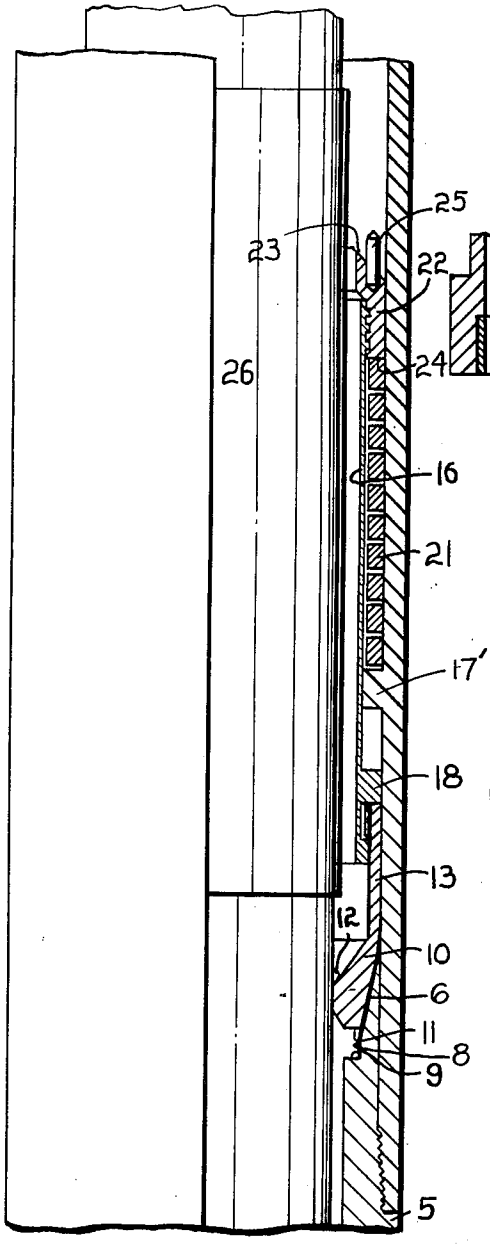

Fig. 4

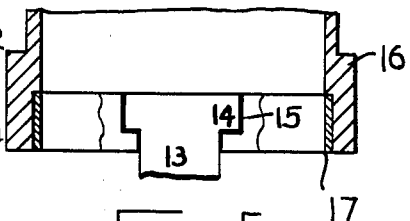

Fig. 5

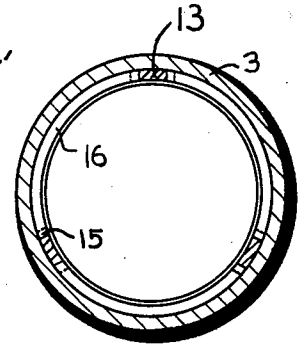

Fig. 6

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Patented Dec. 16, 1952

2,621,960

UNITED STATES PATENT OFFICE

2,621,960

PRESSURE TYPE RELEASING WASHOVER OVERSHOT

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Application November 22, 1946, Serial No. 711,532

9 Claims. (Cl. 294—102)

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The invention relates to a fluid pressure operated type releasing overshot for gripping stuck pipes in wells. The device is capable of being released from the pipe being gripped by relative movement therewith.

An object of the invention is to provide a tool to engage and retrieve pipe from within a well bore.

Another object of the invention is to provide a washover overshot operable by fluid pressure to effect engagement with a pipe in a well bore.

A further object of the invention is to provide a washover overshot for engaging or disengaging a pipe by relative movement of the overshot with respect to the pipe.

A still further object of the invention is to provide a slidable slip holder for a washover overshot.

A further object of the invention is to provide a washover overshot for engaging a pipe, and a slidable slip holder resiliently retained in inoperative position, but movable to operative position by the application of fluid pressure thereto.

Another object of the invention is to provide a washover overshot for engaging a pipe, and a slidable slip holder resiliently retained in inoperative position, but movable to operative position by the application of fluid pressure thereto, said slip holder returning to inoperative position to disengage the washover overshot from the pipe upon relative movement of the overshot with the pipe gripped.

A still further object of the invention is to provide a washover overshot for engaging a pipe, and a slidable slip holder resiliently retained in inoperative position, but movable to operative position by the application of fluid pressure thereto, said slip holder returning to inoperative position to disengage the washover overshot from the pipe upon relative movement of the overshot with the pipe gripped when the fluid pressure is released.

Other objects and advantages of the invention will become readily apparent with a consideration of the following description and drawings wherein:

Fig. 1 is a vertical quarter sectional view showing the overshot ready to be lowered into the well bore;

Fig. 2 is a section on the line 2—2 of Fig. 1, showing the top of the slidable slip holder;

Fig. 3 is a section on the line 3—3 of Fig. 1, showing the arrangement of the slip cage;

Fig. 4 is a vertical quarter section showing the overshot in engagement with a pipe;

Fig. 5 is a vertical section of a portion of the

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slidable slip holder showing a slip retainer ring thereon and the support therefor; and

Fig. 6 is a section on the line 6—6 of Fig. 1, showing the bottom of the slip holder.

Referring in detail to the drawings, the tool as illustrated in Figs. 1 and 4, is shown as having a collar 2 threadedly secured to the upper part of the sleeve or body 3 enclosing the major portion of the tool. The collar is internally threaded at 4 for connection to a string of pipe (not shown) by which the tool is to be operated.

Threaded into the lower end of the sleeve or body 3 is the slip cage 5 which has slip supporting guides 6 therein. The guides 6 formed within the upper portion of the cage are defined by vertical shoulders 7, and tapered wedge faces 8 inclined at an angle to the axis of the tool. The tapered faces end in seats 9 to provide a stop means for the pipe engaging slips 10.

The outer surface of the slips 10 are formed to slidably fit the face 8 and are provided with blunt ends 11 to rest on the seat 9 when the slips are in the lowermost position of the slip cage. The vertical edges of the slips are dovetailed into the edges 7 of the slip supporting guides 6 to insure that the slips will be held in position when they are in the slip bowl, but permitting free longitudinal movement of the slips in and out of position in the slip cage.

The teeth 12 on the inner surface of the slips provide a positive gripping action on the pipe and a number of slips with an equal number of slip supporting guides provided in the slip cage may be used.

The slips 10 are each formed with an upwardly extending arm 13 with the cross arms 14 extending laterally therefrom adjacent the upper end. Such cross arms 14 fit into a slot 15 of the slip holder 16; the slips being held in position in the slip holder by the slip retainer ring 17 on the inner periphery in the lower end of the slip holder and the sleeve 3 as best seen in Fig. 5.

The inner annular shoulder 17 on the sleeve 3 and annular shoulder 18 on the slip holder limit upward movement of the slip holder.

The slip holder 16 extends upwardly adjacent the sleeve 3, the distance therebetween providing a recess 20 to receive the coil spring 21 resting on the shoulder 17'.

A ring 22 with a flange 23 thereon is threadedly secured to the upper end of the slip holder. The lower end 24 of the ring 22 forms an upper stop rest for the coil spring.

The spring is thereby arranged to urge the slip holder 16 upwardly so as to normally retain slips 10 in a retracted position above the slip cage so

that they will not engage the pipe to be gripped until the spring 21 is compressed to permit downward movement of the slip holder and slips into the slip cage.

It seems obvious that this ring could be eliminated by forming an extension similar to this ring on slip holder 16 by having it an integral part of the slip holder.

The spanner wrench pins 25 extending upwardly from the ring 22 permit assembly and disassembly, and may also abut the lower end of collar 4 and serve to keep the ring 22 a spaced distance from the end of the collar so as to prevent the ring from sticking to the collar.

In operation of the tool in accordance with the invention, it is secured to a string of pipe and lowered down over the member to be gripped and retrieved such as a pipe 26 as seen in Fig. 4.

While lowering the tool the slips 10 will be positioned upwardly above the slip cage 5 by the compression spring 21 urging the slip holder 16 to its uppermost position. The pipe 26 is usually stuck in position in the well bore, and the thread on the lower end of the slip cage 5 may carry a rotary shoe to cut away materials in the well around the pipe. The tool will be rotated during such lowering movement and gradually telescoped over the stuck pipe to a position adjacent a tool joint.

A circulation of liquid may be maintained so as to slowly wash away the material about the pipe. When it is determined that the stuck pipe may be pulled loose, the circulation of liquid is increased. The pressure ring 22 serves to restrict the flow of fluid at the tool joint since the tool joint is of a larger diameter than the pipe being pulled so that fluid pressure will be exerted against the flange 23 of the pressure ring 22. This causes the slip holder 16 and the ring 22 to move downwardly, compressing the spring 21 as seen in Fig. 4. The downward movement of the slip holder 16 moves the slips 10 into the slip supporting guides 6 of the slip cage 5 and onto tapered faces 8 which urge the slips 10 into engagement with the pipe 26. While the pressure is maintained through the pipe, a pull is then exerted upon the tool by means of the string of pipe so as to securely grip and dislodge the pipe 26.

It seems obvious that if the pipe 26 is of the flush joint type, the invention here described may be used by merely increasing the flow of fluid so as to cause pressure to be exerted against the flange 23 of the pressure ring 22 to effect downward movement of the slip holder 16.

If the pull on the pipe fails to recover the pipe, or if for some other reason it is desirable to disengage the tool fromt he pipe, further fluid pressure is stopped and the tool is lowered relative to the pipe.

The compression of the spring 21 now exerts an upward force against the slip holder 16, and the ring 22, sufficient to release the slips from the pipe and to move them upwardly within the sleeve 3.

The slips 10 are thus guided back into the body above the tapered faces 8 by the guides 6 of slip cage 5. The pipe 26 is now released from the tool so that the tool may then be removed by an upward lifting force.

It seems apparent that a tool for engaging and retrieving stuck pipe or other similar objects designed in accordance with this invention affords efficient and easy manufacture.

Broadly the invention proposes a tool capable of retrieving stuck pipe or similar objects from a well bore which tool may be disengaged from the stuck pipe by releasing the fluid pressure and simply lowering the tool with respect to the stuck pipe.

The invention claimed is:

1. In a tool to be lowered into and telescoped over a substantial length of pipe in a well and manipulated therein to grip such pipe, tubular slip cage and substantially tubular slip elements having cooperating cylindrical guide and slide surfaces respectively, said guide surfaces being downwardly and inwardly tapered for moving said slip elements inwardly into engagement with such pipe to be gripped, a slip sleeve slidable in said slip cage and supporting said slip elements, and resilient means slidable over such pipe and engaging said slip cage and said slip sleeve to normally retain such slip elements in portions of the guide surfaces where such slip elements will not be in engagement with such pipe, said slip sleeve when telescoped over such pipe being operable by fluid pressure to move the slip elements on the tapered portions of said guide surfaces and thereby inwardly into engagement with such pipe.

2. In a tool to be lowered into and telescoped over a substantial length of pipe in a well and manipulated therein to grip such pipe, an elongate tubular body, a slip bowl at the lower end of said tubular body, said slip bowl being slidable over such pipe to be gripped, substantially tubular slip elements slidable in said slip bowl, said slip bowl and slip elements having cooperating cylindrical guide and slide surfaces respectively, said guide surfaces being downwardly and inwardly tapered for moving said slip elements inwardly into engagement with such pipe, a slip sleeve slidable in said body and supporting said slip elements, and resilient means slidable over such pipe and engaging said body and said slip sleeve to normally retain such slip elements in portions of the guides where such slip elements will not be in engagement with such pipe, said slip sleeve when telescoped over such pipe being operable by fluid pressure to move the slip elements on the tapered portions of the guide surfaces and thereby inwardly into engagement with such pipe.

3. In a tool to be lowered into and telescoped over a substantial length of pipe in a well and manipulated therein to grip such pipe, tubular slip cage and substantially tubular slip elements having cooperating cylindrical guide and slide surfaces respectively, said guide surfaces being downwardly and inwardly tapered for moving said slip elements inwardly into engagement with such pipe to be gripped, a slip sleeve slidable in said slip cage and supporting said slip elements, and spring means disposed between and engaging said slip cage and said slip sleeve to normally retain such slip elements in portions of the guide surfaces where such slip elements will not be in engagement with such pipe, said slip sleeve when telescoped over such pipe being operable by fluid pressure to move the slip elements on the tapered portions of said guide surfaces and thereby inwardly into engagement with such pipe.

4. In a tool to be lowered into and telescoped over a substantial length of pipe in a well bore and manipulated therein to grip such pipe, an elongate tubular body, a slip bowl threaded to the lower end of such tubular body, said slip bowl being slidable over such pipe to be gripped and having downwardly and inwardly tapered guide surfaces, a substantially tubular slip sleeve slidable in said tubular body, slip means connected to said slip sleeve, said slip elements having cylindrical slide surfaces cooperating with said guide

surfaces, and resilient means disposed between and in engagement with said body and said slip sleeve to normally retain such slip sleeve in an elevated position and thereby retain such slip elements in portions of the guide surfaces where such slip elements will not be in engagement with such pipe, said slip sleeve when telescoped over such pipe being movable downwardly by fluid pressure to move the slip elements downwardly along the tapered guide surfaces and thereby inwardly into engagement with such pipe.

5. In a tool to be lowered into and telescoped over a substantial length of pipe in a well and manipulated therein to grip such pipe, an elongate tubular body, a slip bowl threaded to the lower end of said body, said slip bowl being slidable over such pipe to be gripped and having downwardly and inwardly tapered guide surfaces, a pressure ring slidable in said body, slips releaseably supported by said pressure ring, said slips having slide surfaces cooperating with the guide surfaces of said slip bowl, and hollow resilient means slidable over said pipe and engaging said body and said pressure ring to normally retain said pressure ring in an upper position and thereby retain such slips out of engagement with such pipe, said ring when telescoped over such pipe being moveable downwardly by fluid pressure to move said slips downwardly on said tapered guide surfaces and thereby inwardly into engagement with such pipe, said resilient means being operable to elevate said ring relative to said body and thereby move said slips upwardly on said tapered guide surfaces and out of engagement with such pipe when the fluid pressure is released and the tool is lowered relative to the pipe.

6. In a tool to be lowered into and telescoped over a substantial length of pipe in a well and manipulated therein to grip such pipe, an elongate tubular body, a slip bowl threaded to the lower end of said body, said slip bowl being slidable over such pipe to be gripped and having downwardly and inwardly tapered guide surfaces, a pressure ring slidable in said body, slips releaseably supported by said pressure ring, said slips having slide surfaces cooperating with the guide surfaces of said slip bowl, hollow resilient means slidable over said pipe and engaging said body and said pressure ring to normally retain said pressure ring in an upper position and thereby retain such slips out of engagement with such pipe, said ring when telescoped over such pipe being moveable downwardly by fluid pressure to move said slips downwardly on said tapered guide surfaces and thereby inwardly into engagement with such pipe, said resilient means being operable to elevate said ring relative to said body and thereby move said slips upwardly along said tapered guide surfaces and out of engagement with such pipe when the fluid pressure is released and the tool is lowered relative to the pipe, and thread means at the upper end of the body to threadedly secure the tool to pipe by which the tool is manipulated.

7. In a tool to be lowered into and telescoped over a substantial length of pipe in a well and manipulated therein to grip such pipe, an elongate tubular body, a slip bowl disposed at the lower end of said body, said slip bowl being slidable over said pipe to be gripped and having downwardly and inwardly tapered guide surfaces, a sleeve slidable in said body, slips releaseably supported by said sleeve, said slips having slide surfaces cooperating with said guide surfaces of said bowl, a spring disposed between and in engagement with said sleeve and body normally retaining said sleeve in an upper position and thereby retaining such slips out of engagement with such pipe, said sleeve when telescoped over such pipe being moveable downwardly by fluid pressure to move said slips downwardly on said tapered guide surfaces and inwardly into engagement with such pipe, said spring being operable to move said slips out of engagement with said pipe upon release of fluid pressure and lowering of said tool relative to said pipe.

8. In a washover overshot to be lowered into and telescoped over a substantial length of pipe in a well and manipulated therein to grip said pipe, a pair of parts having a passage for said pipe therethrough and relatively moveable to manipulate the overshot, slips supported by one part, guide surfaces inclined with respect to the axis of the parts on the other part for movement of said slips thereon inwardly into engagement with said pipe, and resilient means slidable over such pipe and in engagement with said parts to normally retain said slips in spaced relation to said guide surfaces but yieldable by fluid pressure when telescoped over such pipe to move said parts relative to one another and thereby move said slips along such guide surfaces and thereby into engagement with said pipe.

9. In a tool to be lowered into and telescoped over a substantial length of pipe in a well and manipulated therein to grip such pipe, tubular slip cage and slips having cooperating cylindrical guide and slide surfaces respectively, said guide surfaces being downwardly and inwardly tapered for moving said slips inwardly into engagement with such pipe to be gripped, a slip sleeve slidable in said slip cage and supporting said slips, spring means disposed between and engaging said slip cage and said slip sleeve to normally retain such slips in portions of the guide surfaces where they will not be in engagement with such pipe, and a pressure ring disposed at the top of said slip sleeve for moving said slip sleeve downwardly by fluid pressure when such pressure ring is telescoped over such pipe to move the slips downwardly along the tapered portions of said guide surfaces and thereby inwardly into engagement with such pipe.

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