

Dec. 16, 1952

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2,621,959

OVERSHOT TOOL

Filed Oct. 31, 1949

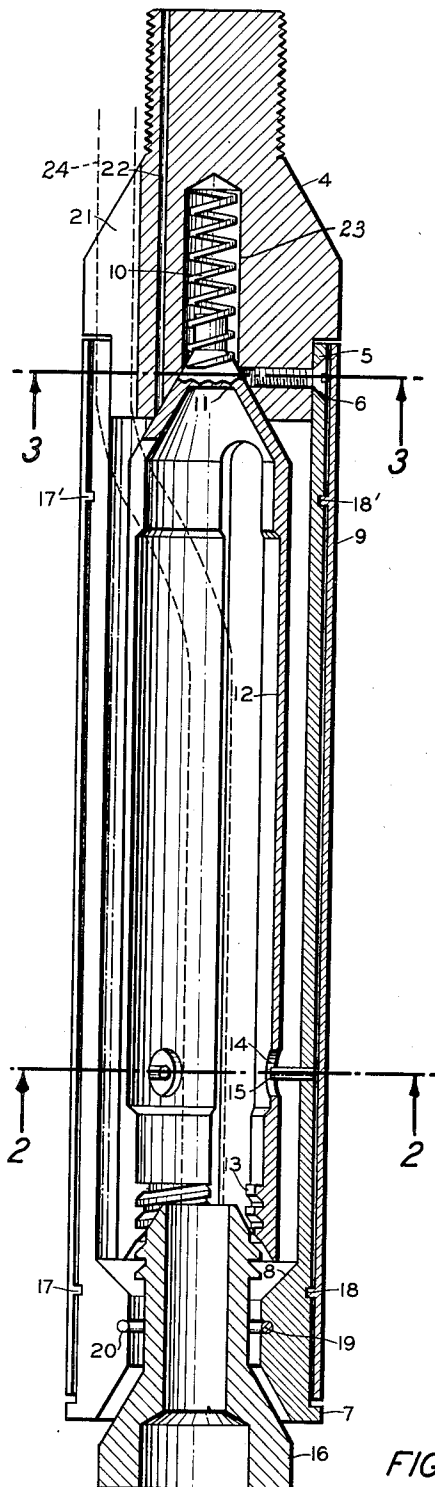


FIG. 1.

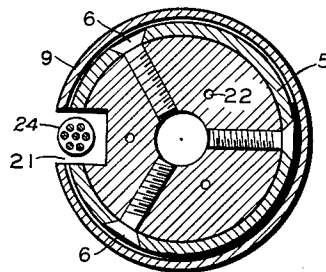


FIG. 3.

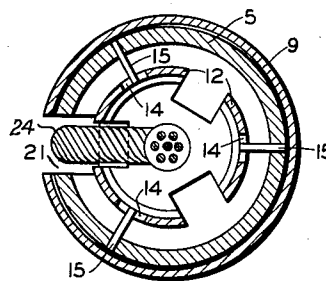


FIG. 2.

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2,621,959

OVERSHOT TOOL

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Application October 31, 1949, Serial No. 124,714

5 Claims. (Cl. 294—86)

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This invention relates to an overshot tool. In one of its aspects the invention relates to an overshot tool which can be employed to place, or to remove, an object at a point deep in the ground, for example at the bottom of an oil well. In a more specific aspect the invention provides a tool which can be lowered into a well down through which is extended a cable, without the removal or cutting of said cable, to place or to retrieve an object in said well, for example a seismograph or a well instrument. In an embodiment of the invention there is provided a tool which once assembled remains unitary at all times during its use but is adapted to receive into itself a cable, which may be attached to the object to be placed into or retrieved from a well hole, by merely operating a rotatably sliding cylinder as set forth more fully below.

Overshot fishing tools are known in the art. One of these is so constructed that it can surround a cable attached to the object or tool sought to be recovered. To this end the prior art tool is provided with a slot into which the cable can be threaded. The slot is provided with a key which covers, and retains the cable in, the slot. The key itself is retained by screws which pass through the said key and into the body of the tool. It is clear that in the use of the tool it is necessary to insert the cable and then to place the retaining key in the slot and then to drive home the screws which fasten the key to the body of the tool. Also, when the tool has been used to lift to the surface the desired object the screws must be removed, then the key must be removed and finally the cable can be taken from the tool, unless the cable is cut in which event it will not be necessary to remove the key and the screws which fasten it into position until another use is made of the tool. It is also evident that when screws are employed, these may become loose and drop out. In such event the key would also drop out or even be pushed out by the cable motion in the slot. Thus, a part of the retrieving tool would have to be itself retrieved from the hole or replaced. Furthermore, unless the part of the retrieving tool which has fallen into the hole is itself retrieved, it may hamper the original retrieving operation. Also, it is to be noted specially that said prior art device is not employable to place and to release a cabled object in a well hole.

There is also known in the art a fishing tool comprising a bell-shaped housing in combination with an expandable set of jaws located and urged downwardly therein by means of a compressible spring located between the upper por-

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tion of the bell and the upper portion of the said jaws. As the bell portion is raised a beveled or seat portion around the inside of the bottom of the housing presses against the jaws urging these together while the said spring urges said jaws against said seat portion thus taking hold of the pipe to be pulled. Such a fishing tool cannot be employed to set into place in, or to remove from, a well hole an object to which is attached a cable, say a cable-suspended tool. Also, this prior art pipe puller cannot be employed readily to place an object into the bottom of a well hole, although it is adapted to release a pipe which is hopelessly stuck in the hole.

An object of this invention is to provide an overshot tool which can be employed to place into or to remove from a well an object such as a seismograph, a well instrument or a cable-suspended tool.

Another object of the invention is to provide a unitary overshot tool which during its employment remains complete assembled or unitary.

A further object of the invention is to provide an overshot tool the construction features of which are such that it does not have any parts which, once the tool is assembled, prior to its employment, must be removed and replaced, thereby ensuring that no part, or parts, of said tool can become disengaged or disassembled, because of an improper assembly, and drop into the hole in which it is employed.

Further, still, it is another object of the invention to provide an overshot tool the construction features of which are such that its assembly must needs be properly effected and when so effected no part thereof can become disengaged and drop into the hole in which it is employed.

Other objects as well as advantages of the invention here presented are obvious from this disclosure, the appended claims and the drawing.

According to this invention there is provided an overshot tool comprising in combination at least two slotted substantially cylindrical and concentrically disposed elements so adapted and arranged that the outer element is rotatably slidable upon the inner element and an overshot collet which is so adapted to and arranged with said elements as to engage upon and to release a cabled object without cutting the cable or otherwise removing it from said object.

Reference will now be made to the drawing in which is shown, in several views, an embodiment according to this invention. In the drawing Figure 1 is an elevational cross-section view of the embodiment the cable being shown in dotted lines. Figure 2 shows a transverse view taken

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along the line 2—2 of Figure 1. Figure 3 shows a transverse view taken along line 3—3 of Figure 1 with the overshot collet and spring removed.

In Figure 1 the following elements or members of the tool are shown, support head 4 formed and threaded at its upper end to be engaged by a correspondingly threaded pipe; supporting inner slotted cylinder 5 fastened to support head 4 by means of screws 6 and provided with a flange 7 at its bottom end and inner beveled seat 8; and groove 20 which contains a slotted retaining ring 19; rotatably slidable and slotted outer cylinder 9 which rests upon flange 7; a spring 10 in a vertical recess 23 in support head 4; collet 11 shaped at its upper end to spear into spring 10 in a manner such that motion of the support head 4 towards collet 11 will cause compression of spring 10; slotted fingers 12 threaded with double buttress threads 13 and slotted as shown at 14; pins 15 fixed into inner supporting cylinder 5 and jutting into slots 14 in a manner to prevent substantially any rotation of the collet and consequently its fingers 12 relative to supporting cylinder 5 but allowing motion of each finger 12 towards and away from said supporting cylinder; and the threaded upper end 16 of an object to be placed into or recovered from a hole in the ground according to the objects of this invention. The object is one which is formed to receive a cable into its upper bored end. The cable 24 is shown in dotted lines in this figure.

To assemble the tool spring 10 is placed upon collet 11 held in an upright position. This assembly is then placed into supporting cylinder 5 the fingers 12 of collet 11 being pressed towards its longitudinal axis to pass over and to engage the pins 15. Then outer rotatably slidable cylinder 9 is placed upon inner supporting cylinder 5. Supporting head 4 is now lowered, over spring 10, until its shouldered portion fits into inner supporting cylinder 5. By rotating outer cylinder 9 until its slot is opposite each of the screw holes shown in supporting head 4 screws are then placed into position. When in use the slot in outer cylinder 9 is so placed that none of the screw heads is uncovered. To prevent undesired rotation of the outer cylinder about the supporting cylinder there can be provided a tongue and groove, or ball and socket, or equivalent means, on the outer surface of the inner cylinder and on a surface of the outer cylinder. Thus, outer slotted cylinder 9 can have a short protrusion or tongue 17 and 17' which fits into a sloping groove 18 and 18' on inner slotted cylinder 5, so that a one half turn of the outer slotted cylinder 9 will jam its lower end against flange 7 thereby preventing any undesired rotation of the cylinder 9.

Thus it is that there is provided an overshot tool which has all of the features and advantages set out in the object of this invention.

In operation, to lower a cabled object into a well, the slots in the outer and supporting cylinders are aligned, the cable 24 is threaded into the interior of the tool and the outer cylinder is placed to its closed position following which the tool is pushed down upon the object as shown in Figure 1. The fingers 12 are spread apart and the double buttressed threads become engaged. At this stage the tool is pulled upwardly whereupon beveled seat 8 acts against fingers 12, the collet being urged downwardly, securing these to the object by means of the respective threaded portion of each. As long as the weight of the object is supported by the tool the fingers 12 hold

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rigidly the object carried by them. After the object has been lowered into position the tool is rotated to uncouple it from the object. It is to be noted that the cable passes up through the center of the collet which holds the cabled object concentrically in its fingers. The cable then passes out through groove 21 in the supporting head. A snap retaining ring 19 prevents the cable from becoming fouled. This ring 19 is in the form of a C and, before the cable is inserted, is positioned with the open part of the C in line with the slot in cylinder 5. After the cable is inserted, ring 19 is turned so as to prevent re-entry of the cable into the slot.

Holes 22 in the supporting head are provided in the tool for use in the event that the object to be recovered has been buried by a sloughing off of the walls of the well bore. In such use fluid circulation can be established through the interior of the lowering tube (not shown) which is fastened to supporting head 9. The force of fluid through holes 22 stirs up the sand and allows the tool to be lowered to the object.

Reasonable variation and modification are possible within the scope of the foregoing disclosure and the appended claims to the invention the essence of which is that an overshot tool, comprising in combination at least two slotted substantially cylindrical and concentrically disposed elements so adapted and arranged that the outer element is rotatably slidable upon the inner to enclose a cable and a collet which is adapted to and arranged with said elements as to enable the tool to engage upon and to release a cabled object without cutting the cable or otherwise removing it from said object, has been set forth and its elements, assembly and operation described so as to enable one skilled in the art to assemble and to employ the same. Other applications of the mechanism of the invention will be apparent to those skilled in the art of like machines.

I claim:

1. An overshot tool which comprises a support head; a spring receiving recess in the lower end of said head; a longitudinal slotted hollow support body fixedly attached to said head; an outwardly projecting flange on the end of said support body opposite the point of attachment of said body to said head; a longitudinally slotted, rotatably mounted, outer member positioned around said support body and retained thereon by said flange on said support body; an inner beveled seat in the end portion of said support body opposite the point of attachment to said support body; a spring in said spring receiving recess in said head; and a collet comprising a plurality of fingers extending longitudinally within and with respect to said support body, said fingers being rigidly connected at their upper ends and disconnected at their lower ends, and being provided with connecting means for gripping an object to be gripped by said tool at their lower ends, the upper end of said collet contacting the lower end of said spring and being biased downwardly to a resting position on said inner beveled seat.

2. The tool of claim 1 wherein said connecting means comprises double buttressed threads.

3. The tool of claim 1 wherein at least one of said fingers is provided with an opening therein; and the support body is fixed against rotation with at least one element extending inwardly from its inner surface positioned so that said element protrudes into the opening in the finger.

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4. The tool of claim 1 wherein the support head is provided with at least one fluid passageway extending from the upper end to the lower end of said head and communicating with the interior of said tool.

5. The tool of claim 1 in which undesired rotation of the said outer cylinder upon said hollow support body is prevented by providing one of said members with a helically extending groove and the other of said members with a tongue which extends into and cooperates with said groove so as to cause said outer cylinder to move downwardly against said flange upon rotation in a proper direction.

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