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DRILL PIPE COLLAR REFACING TOOL

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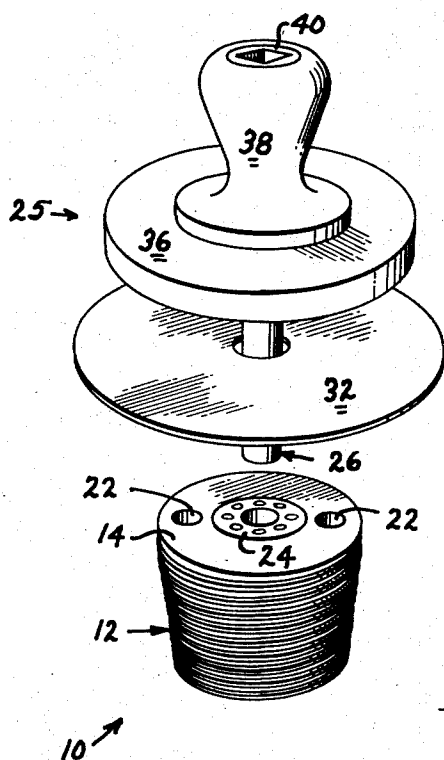


FIG. 1

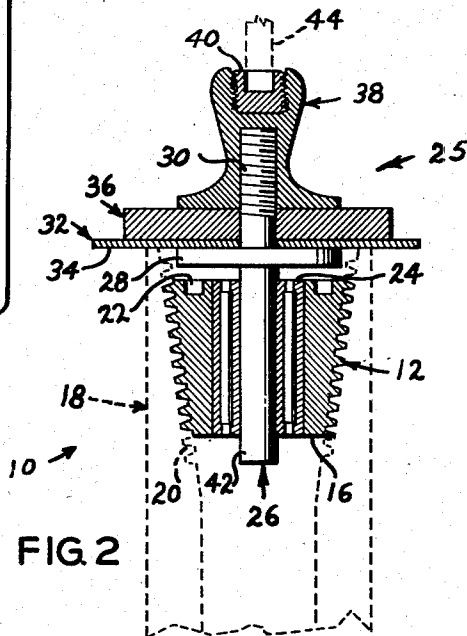


FIG. 2

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DRILL PIPE COLLAR REFACING TOOL

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4 Claims. (Cl. 51—241)

The present invention relates to the oil well drilling industry and more particularly to a device for grinding or refacing the damaged box ends of drill pipe tool joints.

In using conventional drill pipe the connection between the joints of pipe is usually made by means of tool joints. Each tool joint is divided and separably connected intermediate its ends by means of a threaded box and pin end. The box and pin ends of the tool joints are usually carefully machined and depend largely on close shoulder to shoulder contact of these members to prevent leakage of fluid through the joint. However, in pulling and re-running drill pipe, the shoulders of the box ends become damaged or dented by the pin end of the adjacent or next upper joint of drill pipe being inadvertently set down on the shoulder of the box as the pin end is stabbed into the box. Joints of drill pipe having badly damaged box ends must be sent to a machine shop for refacing the shoulders of the boxes.

The principal object of this invention is to provide a device for grinding or refacing the damaged shoulders of the box ends of tool joints in the field.

Another important object of this invention is to provide a device of this class which utilizes the threads of the box end itself to guide the device during the grinding operation.

An additional object is to provide a device for refacing the shoulders of almost any standard size drill pipe tool joint.

A further object is to provide a device of this class which is comparatively small and compact and may be easily operated by one workman.

A further object is to provide a device of this class which utilizes portable power means, such as a hand drill, for operating the device.

Yet another object is to provide a device of this class which may use a replaceable comparatively inexpensive grinding disk for the refacing action.

The present invention accomplishes these and other objects by providing a centrally bored guide or pilot body which is threadedly engaged externally by the threads of the box end of a tool joint. The length of the body is preferably substantially less than the length of the threads of the box end. The bore of the body is provided with a ball or roller bearing extending the length of the body. A shaft or spindle having an annular shoulder intermediate its ends is rotatably received by the bearing of the body. An abrasive disk and plate are rigidly held against one side of the shoulder by a head threadedly engaged with the end of the spindle opposite the end journaled by the body. Diametrically the disk and plate are larger than the diameter of the box end and one surface of the disk is in face to face contact with the shoulder, forming the end of the box end of a tool joint.

The head is rotated by connecting the same with power means by means of a recess provided in the free end of the head. Rotation of the abrasive disk grinds and refaces the end or shoulder of the tool joint box end.

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Other objects will be apparent from the following description when taken in conjunction with the accompanying single sheet of drawings, wherein:

Figure 1 is a partially exploded perspective view of the device, per se; and

Figure 2 is a vertical cross sectional view of the device in operating position of the box end of a tool joint, the box end being shown in dotted lines.

Like characters of reference designate like parts in those figures of the drawings in which they occur.

In the drawings:

The reference numeral 10 indicates the device, as a whole, comprising a pilot or guide body 12 which is truncated conoidal in general configuration having its upper or outwardly disposed end 14 parallel with the lower or inwardly disposed end 16. The body 12 is externally threaded its entire length, complementary with the tapered threads of the box end 18 of a tool joint. Longitudinally the body 12 is shorter than the length of the threads 20 of the box end. The body 12 is of a size diametrically so that it will seat with or be frictionally engaged with the threads 20 of the box end for which it is intended before the lower end 16 reaches the bottom or last thread within the box end. The end 14 is provided with spaced-apart recesses 22 for receiving a spanner wrench, not shown, by which the body 12 is installed or removed from the threads of the box end. The body 12 is centrally bored longitudinally to receive an anti-friction bearing 24 therein. The bearing 24 may be of the roller type as shown or one or more ball bearings if desired. It is preferred that the bearing 24 extend substantially the full length of the bore of the body 12 for the reasons which will presently be apparent.

A grinding unit 25 is rotatably carried by the bearing 24. The grinding unit 25 comprises the following parts:

A shaft or spindle 26 of a selected length is provided with an annular shoulder 28 intermediate its ends, preferably of a diameter substantially less than the inside diameter of the outer or large end of the tool joint box end 18. The opposing sides of the shoulder 28 are substantially flat and perpendicular with relation to the longitudinal axis of the spindle 26. The spindle 26 is of a selected diameter which is easily received within the bore of the bearing 24 as more fully explained herein below. One end portion of the spindle is threaded, as at 30.

An abrasive disk 32 which, in the embodiment shown in the drawings, is a centrally bored disk of emery cloth, or the like, having at least one abrasive or grinding surface 34, is axially received by the threaded end 30 of the spindle disposing the abrasive surface 34 against the adjacent surface of the shoulder 28. Diametrically the disk 32 is preferably substantially larger than the outside diameter of the box end 18. It seems obvious that any abrasive or grinding disk or wheel, having opposing parallel sides, not shown, may be used in lieu of the disk 32 if desired, without departing from the spirit of the invention.

A substantially flat plate 36, preferably circular and greater diametrically than the outside diameter of box end 18, is axially received by the end portion 30 of the spindle. A knob-like handle or head 38 threadedly engages the end portion 30 axially and flatly impinges the disk 32 between the plate 36 and the shoulder 28. The outwardly disposed end of the head 38, opposite the plate 36, is axially bored and threaded a selected depth for receiving a socket type set-screw 40 therein for the reasons which will presently be apparent.

The free end portion 42 of the spindle opposite the threaded end 30 is inserted longitudinally into the bore of the bearing 24, disposing the shoulder within the outer end of the box end 18 and placing the abrasive surface 34 of the disk 32 in flat face to face contact with the outer

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end of the box end 18. The end portion 42 is preferably long enough to extend beyond the end 16 of the body. A mandrel 44, power driven as by a portable electric drill, not shown, is inserted into the socket of the set screw 40 for rotating the grinding unit 25. The guide body 12 is accurately positioned by the threads 20 and in turn guides the spindle 26 of the grinding unit 25 to reface the outer end of the box end 18 by the abrasive action of the disk 32. It seems obvious that the desired amount of pressure may be applied longitudinally to the grinding unit 25 to hasten the grinding action.

Obviously the invention is susceptible to some change or alteration without defeating its practicability, and I therefore do not wish to be confined to the preferred embodiment shown in the drawings and described herein, further than I am limited by the scope of the appended claims.

I claim:

1. A grinding tool for refacing the box end of a drill pipe tool joint, including: a centrally bored pilot body having a length less than the length of the threads of said box end, said body threadedly engaged within said box end disposing the outer end of said body in inwardly spaced relation with the outer free end of said box; a spindle having an annular shoulder intermediate its ends, the diameter of said shoulder being less than the inside diameter of the outer end of said box, one end of said spindle rotatably received by the bore of said body disposing said shoulder within the outer end of said box, the end of said spindle opposite the first said end projecting outwardly beyond the free end of said box; an abrasive disk axially received by the outer end of said spindle adjacent said shoulder, the diameter of said disk being greater than the outside diameter of said box; a centrally bored plate member axially received by the outer end of said spindle adjacent said disk; and a head threadedly engaged with the outer end of said spindle for impinging said disk between said plate and said shoulder whereby rotation of said head revolves said disk for grinding and refacing the outer end of said box.

2. A grinding tool for refacing the box end of a drill pipe tool joint, including: a centrally bored externally threaded pilot body having a length less than the length of the threads of said box end, said body threadedly engaged within said box end disposing the outer end of said body in inwardly spaced relation with the outer end of said box, a bearing carried by the bore of said body;

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a spindle having one end portion disposed within said bearing and having the end opposite the first said end projecting outwardly beyond the outer end of said box, said spindle having an annular shoulder intermediate its ends disposed within the outer end of said box in circumferentially spaced-apart relation with relation to the inside diameter of the outer end of said box end; an abrasive disk axially connected to said spindle adjacent the outwardly disposed side of said shoulder; a plate axially received by said spindle adjacent said disk, the diameters of said disk and said plate being at least as great as the outside diameter of said box end; and a head threadedly engaged with the outer end of said spindle for impinging said disk between said plate and said shoulder, whereby rotation of said head revolves said disk for grinding and refacing the outer end of said box.

3. Structure as specified in claim 2 in which the outer end of said head is provided with a socket for connecting with power means to rotate the head.

4. A grinding tool for refacing the box end of a drill pipe tool joint, including: a truncated conical centrally bored body threadedly engaged within said box end intermediate the ends of the latter; a bearing extending the length of the bore of said body; a spindle having an annular shoulder intermediate its ends, the diameter of said shoulder being less than the largest diameter of said body; a disk axially received by said spindle adjacent said shoulder, said disk having an abrasive surface facing said shoulder; a plate axially disposed around said spindle adjacent said disk; and a head threadedly received by said spindle for impinging said disk between said plate and said shoulder, whereby the end of said spindle opposite said head is rotatably received by said bearing for disposing the abrasive surface of said disk flatly against the end of said box end for grinding and refacing the same by rotating said spindle.

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