US012031394B2

(12) **United States Patent**
Pucciarello

(10) **Patent No.: US 12,031,394 B2**
(45) **Date of Patent: Jul. 9, 2024**

(54) **ROD COUPLING REMOVER DEVICE**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 69 days.

(21) Appl. No.: **17/672,509**

(22) Filed: **Feb. 15, 2022**

(65) **Prior Publication Data**

US 2023/0258045 A1 Aug. 17, 2023

(51) **Int. Cl.**
E21B 19/16 (2006.01)
E21B 19/08 (2006.01)
E21B 41/00 (2006.01)

(52) **U.S. Cl.**
CPC ***E21B 19/16*** (2013.01); ***E21B 19/08*** (2013.01); ***E21B 41/00*** (2013.01)

(58) **Field of Classification Search**
CPC E21B 19/02; E21B 19/08; E21B 41/00; E21B 19/16
See application file for complete search history.

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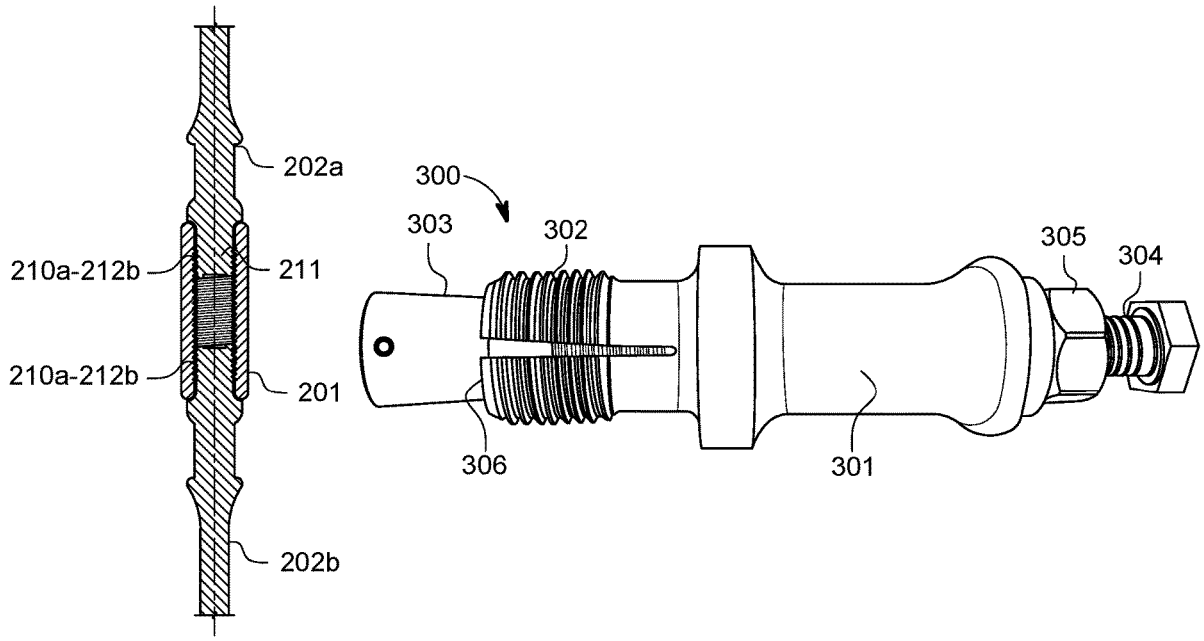
(57) **ABSTRACT**

A rod coupling remover device is a device having a body having a top end, a bottom end, and a shaft opening running from the top end and the bottom end, a bifurcated threaded portion about the bottom end of the body, a retractable wedge, a shaft opening running from a top end to a bottom end of the body, and a threaded shaft member coupled to the retractable wedge at the bottom end of the body. The threaded shaft member passes through the shaft opening of the body in which the retractable wedge is movable into and out of the shaft opening of the body.

10 Claims, 3 Drawing Sheets



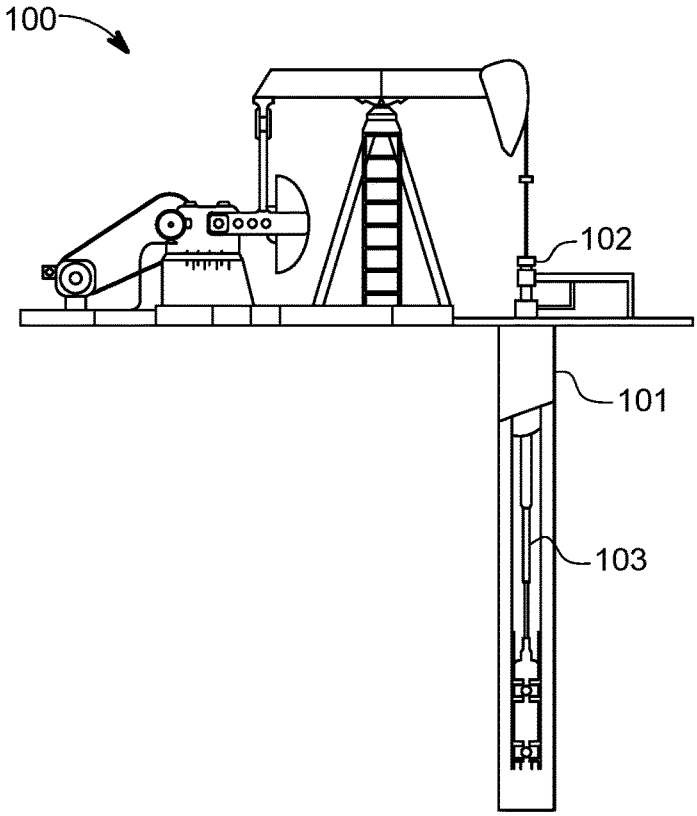


FIG. 1

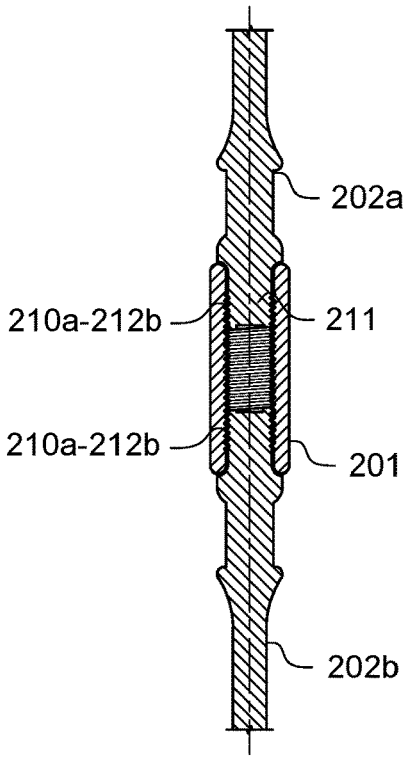


FIG. 2

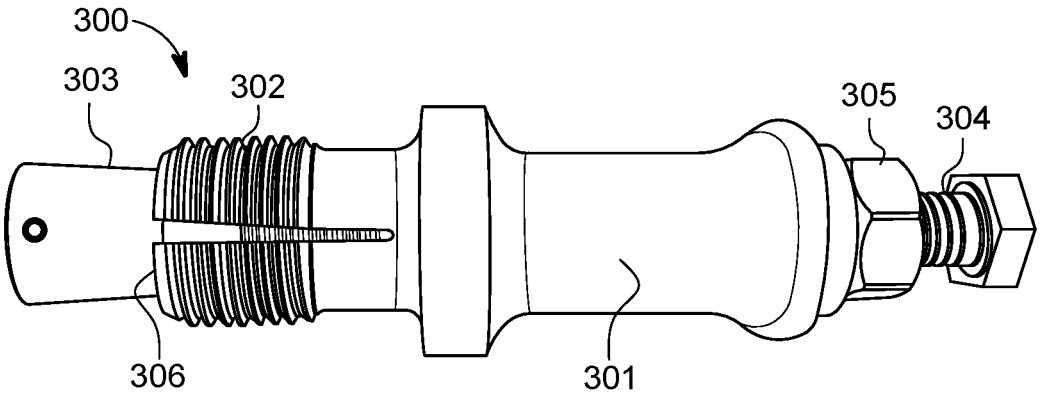


FIG. 3

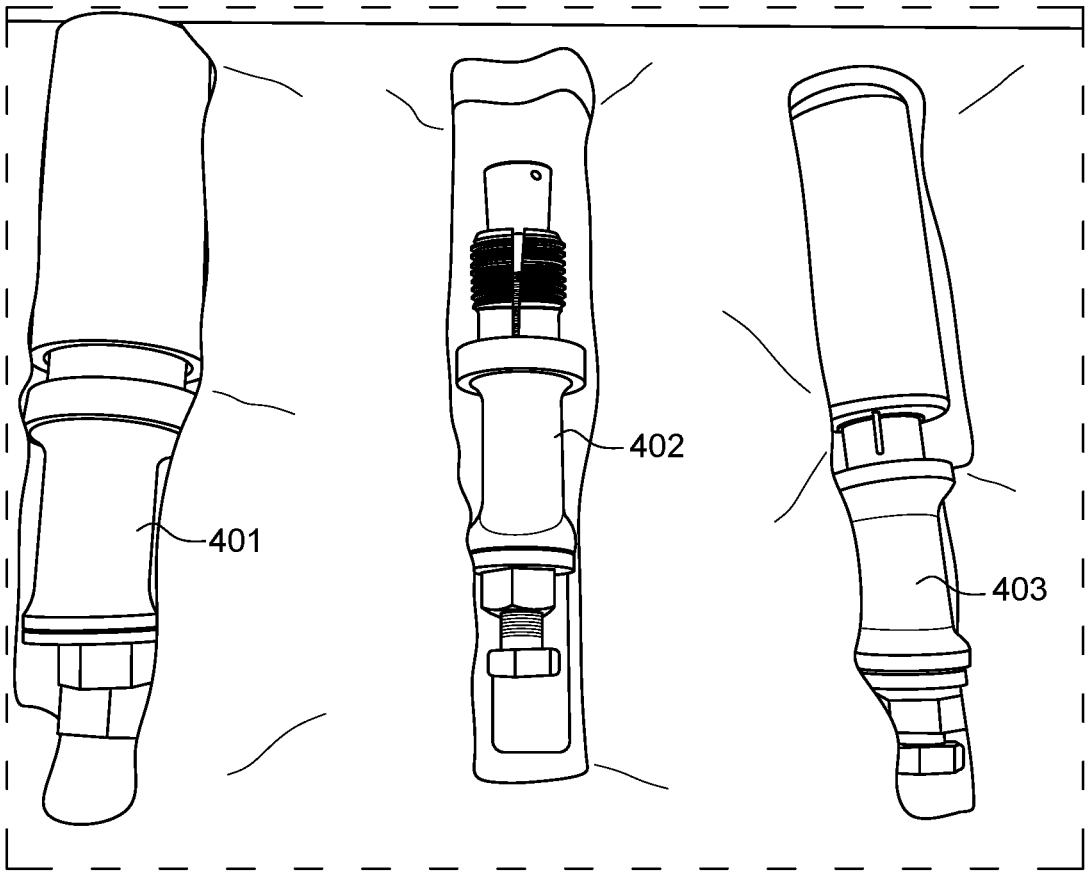


FIG. 4

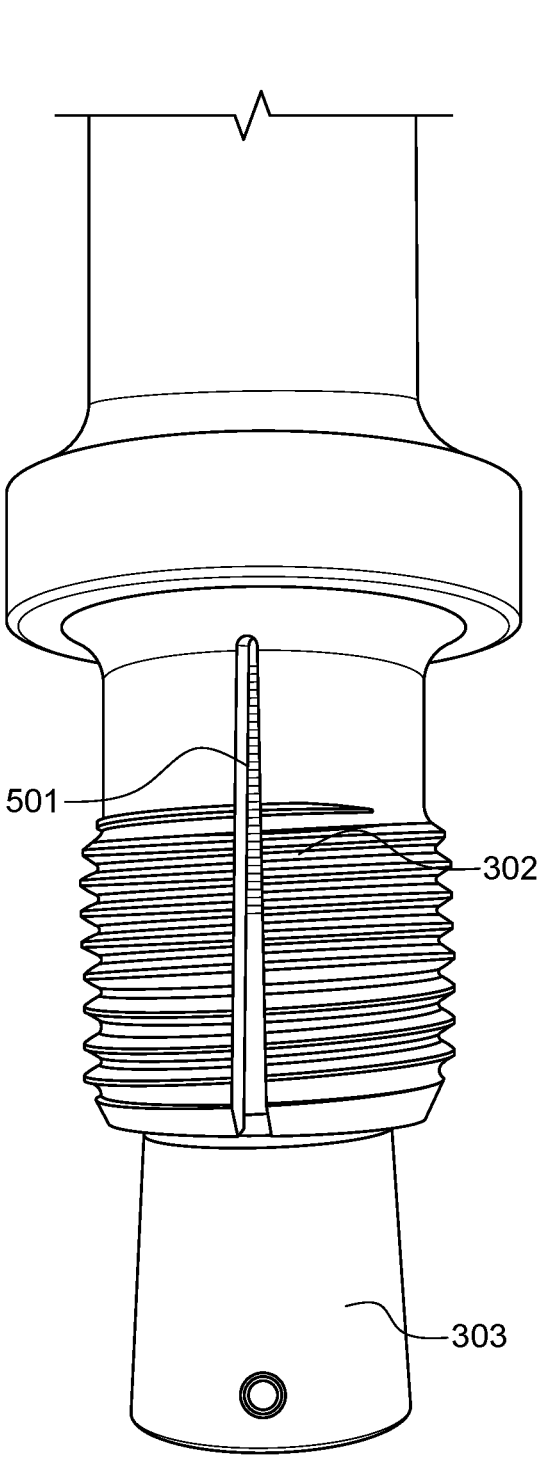


FIG. 5

ROD COUPLING REMOVER DEVICE

TECHNICAL FIELD

This application relates in general to an article of manufacture for providing an oil extraction device, and more specifically, to an article of manufacture for providing a rod coupling remover device.

BACKGROUND

Oil extraction from wells require a rod string of sucker rods to be coupled together to connect a pumping unit to a pump within the wellhead. In order to maintain the well and ensure its operation, the rod string needs to be maintained with various sucker rods being replaced periodically. A user typically finds the process of removing and attaching each sucker rod from the rod string difficult as the sucker rods are coupled together by a set of rod coupling devices. These rod coupling devices are difficult to restrain while constructing the rod string as the rod coupling devices need to easily move within the wellhead.

Therefore, a need exists for an article of manufacture for providing a rod coupling remover device. The present invention attempts to address the limitations and deficiencies in prior solutions according to the principles and example embodiments disclosed herein.

SUMMARY

In accordance with the present invention, the above and other problems are solved by providing an article of manufacture for a rod coupling remover device according to the principles and example embodiments disclosed herein.

In one embodiment, the present invention is an article of manufacture for providing a rod coupling remover device. The rod coupling remover tool includes a body having a top end, a bottom end, and a shaft opening running from the top end and the bottom end, a bifurcated threaded portion about the bottom end of the body, a retractable wedge, a shaft opening running from a top end to a bottom end of the body, and a threaded shaft member coupled to the retractable wedge at the bottom end of the body. The threaded shaft member passes through the shaft opening of the body in which the retractable wedge is movable into and out of the shaft opening of the body.

In another aspect of the present invention, the remover tool further includes a tightening nut coupled around the threaded shaft member about the top end of the body, the tightening nut rotates about the threaded shaft to prevent movement of the retractable wedge once the retractable wedge is within the shaft opening of the body, and an enlarging slit vertically positioned along the bifurcated threaded portion.

In another aspect of the present invention, the retractable wedge enlarges the bifurcated threaded portion of the body as the retractable wedge enters the shaft opening into the body.

In another aspect of the present invention, the bifurcated threaded portion of the body is configured to engage a rod coupling having a threaded cavity having one or more threaded diameters.

In another aspect of the present invention, the bifurcated threaded portion has a threaded diameter comprising ¾", ⅞", and 1".

The foregoing has outlined rather broadly the features and technical advantages of the present invention in order that the detailed description of the invention that follows may be better understood. Additional features and advantages of the invention will be described hereinafter that form the subject of the claims of the invention.

It should be appreciated by those skilled in the art that the conception and specific embodiment disclosed may be readily utilized as a basis for modifying or designing other structures for carrying out the same purposes of the present invention. It should also be realized by those skilled in the art that such equivalent constructions do not depart from the spirit and scope of the invention as set forth in the appended claims. The novel features that are believed to be characteristic of the invention, both as to its organization and method of operation, together with further objects and advantages will be better understood from the following description when considered in connection with the accompanying figures. It is to be expressly understood, however, that each of the figures is provided for the purpose of illustration and description only and is not intended as a definition of the limits of the present invention.

BRIEF DESCRIPTION OF THE DRAWINGS

Referring now to the drawings in which like reference numbers represent corresponding parts throughout:

FIG. **1** illustrates example embodiments of an oil well needing an article of manufacture providing a rod coupling remover device according to the present invention.

FIG. **2** illustrates a pair of sucker rods connected by a coupling that uses an article of manufacture for a rod coupling remover device according to the present invention.

FIG. **3** illustrates an article of manufacture providing a rod coupling remover device according to the present invention

FIG. **4** illustrates different sizes of a first embodiment of an article of manufacture providing a rod coupling remover device according to the present invention.

FIG. **5** illustrates a close up view of an article of manufacture providing a rod coupling remover device according to the present invention.

DETAILED DESCRIPTION

This application relates in general to an article of manufacture for providing an oil extraction device, and more specifically, to an article of manufacture providing a rod coupling remover device according to the present invention.

Various embodiments of the present invention will be described in detail with reference to the drawings, wherein like reference numerals represent like parts and assemblies throughout the several views. Reference to various embodiments does not limit the scope of the invention, which is limited only by the scope of the claims attached hereto. Additionally, any examples set forth in this specification are not intended to be limiting and merely set forth some of the many possible embodiments for the claimed invention.

In describing embodiments of the present invention, the following terminology will be used. The singular forms "a," "an," and "the" include plural referents unless the context clearly dictates otherwise. As used herein, a plurality of items, structural elements, compositional elements, and/or materials may be presented in a common list for convenience. However, these lists should be construed as though each member of the list is individually identified as a separate and unique member. Thus, no individual member of such list should be construed as a de facto equivalent of any other member of the same list solely based on their presentation in a common group without indications to the con-

trary. As used herein, the singular forms "a," "an," and "the" are intended to include the plural forms as well, unless the context clearly indicates otherwise.

It further will be understood that the terms "comprises," "comprising," "includes," and "including" specify the presence of stated features, steps or components, but do not preclude the presence or addition of one or more other features, steps or components. It also should be noted that in some alternative implementations, the functions and acts noted may occur out of the order noted in the figures. For example, two figures shown in succession may in fact be executed substantially concurrently or may sometimes be executed in the reverse order, depending upon the functionality and acts involved.

The terms "individual" and "user" refer to an entity, e.g., a human, using an article of manufacture providing a rod coupling remover device according to the present invention. The term user herein refers to one or more users.

The term "invention" or "present invention" refers to the invention being applied for via the patent application with the title "Rod Coupling Remover Device." Invention may be used interchangeably with remover.

In general, the present disclosure relates to an article of manufacture providing a rod coupling remover device according to the present invention. To better understand the present invention, FIG. **1** illustrates example embodiments of an oil well needing an article of manufacture providing a rod coupling remover device according to the present invention. A typical oil well **100** comprises many components working together to extract the crude oil from the well for capture and use. The crude oil is removed by a pumping unit **102** interacting with a rod string **103** within the wellhead **101**. In order for the crude oil to be extracted, a string of sucker rods is combined to create the rod string **103** to connect the pumping unit **102** to the pump **104** within the wellhead **101**.

FIG. **2** illustrates a pair of sucker rods connected by a coupling that uses an article of manufacture providing a rod coupling remover device according to the present invention. In creating the rod string **103**, a plurality of sucker rods **202***a-b* is coupled together making a continuous rod string to connect the pumping unit **102** to the pump within the wellhead **101**. Each sucker rod **202***a* is connected to a subsequent sucker rod **202***b* within the rod string **103** as shown in FIG. **2**. Each end of the sucker rod **202***a* has a threaded end **212***a* that engages a first set of threads **210***a* to a threaded cavity **211** on each end of a rod coupling device **201**. The rod coupling device **201** has a second set of threads **210***b* to the threaded cavity **211** for engaging the threaded end **212***b* of the subsequent sucker rod **202***b*.

The present invention compromises a tool **300** as shown in FIG. **3**, that may have a bifurcated threaded portion for removing couplings used to fasten sucker rods used in oil well production. As such, FIG. **3** illustrates an article of manufacture providing a rod coupling remover device according to the present invention. The rod coupling remover tool **300** comprises a body **301**, a bifurcated threaded portion **302**, a retractable wedge **303**, a threaded shaft member **304** coupled to the retractable wedge **303**, and a shaft opening **306** running from a top end to a bottom end of the body. The treaded shaft member **304** passes through a shaft opening **306** within the body **301**, and a tightening nut **305**.

The bifurcated threaded portion may include the retractable wedge **303** to increase the rod coupling remover tool's **300** ability to remove necessary rod couplings **201** from an existing rod string **103**. The rod coupling remover tool **401-403** can be made for all sizes of rod couplings, 1"; ¾"; ⅞" among others as shown in FIG. **4**. By increasing the ease of removability of the rod coupling **201**, the rod coupling remover tool **300** will decrease down time on producing wells which will increase profit for oil companies worldwide.

To use the rod coupling remover tool **300**, the bifurcated threaded portion **302** is coupled to a rod coupling device **201** in the same manner as a sucker rod **202***a-b*. The rod coupling remover tool **300** is easily coupled to a hand-tight configuration by a user.

The retractable wedge **303** may be retracted into the bifurcated threaded portion **302** by pulling the threaded shaft **304** at the opposite end of the body **301**. The retractable wedge **303** widens toward its outer end that exerts a force upon the bifurcated threaded portion **302** causing the bifurcated threaded portion **302** to expand via the slot **306** through the bifurcated threaded portion **302**. The tightening nut **305** may be rotated to further retract the retractable wedge **303** to tighten the bifurcated threaded portion **302** within the rod coupling device **201**. When the tightening nut **305** has been tightened, the rod coupling remover tool **300** is securely coupled within the rod coupling device **201**.

The rod coupling remover tool **300** may be secured by securing the body **301** of the rod coupling remover tool **300** to allow a user to untighten and remove a sucker rod **202***b* from the opposite end of the rod coupling device **201**. Once the sucker rod **202***b* has been removed from the rod coupling device **201**, the rod coupling remover tool **300** also may be removed by untightening the tightening nut **305** and reversing the above steps to disconnect the rod coupling remover tool **300** from the rod coupling device **201**.

FIG. **5** illustrates a close up view of an article of manufacture providing a rod coupling remover device according to the present invention. In this embodiment, the rod coupling remover tool **300** is shown as the retractable wedge **303** is inserted into the tool. An enlarging slit **501** is located vertically through the bifurcated threaded portion **302** to permit the bifurcated threaded portion **302** to expand outward as the retractable wedge **303** is retracted within the tool **300**. When the bifurcated threaded portion **302** has been coupled to the sucker rod **202***a*, the retraction of the retractable wedge **303** increases a retention force between the tool **300** and the coupling **201** to enable the sucker rod **202***a* to be unscrewed from the opposite end of the coupling **201**. Once the sucker rod **202***a* has been detached from the coupling **201**, the retractable wedge **303** may be extended from within the bifurcated threaded portion **302** of the tool **300** to permit the tool to be detached from the coupling **201**.

Even though particular combinations of features are recited in the present application, these combinations are not intended to limit the disclosure of the invention. In fact, many of these features may be combined in ways not specifically recited in this application. In other words, any of the features mentioned in this application may be included in this new invention in any combination or combinations to allow the functionality required for the desired operations.

No element, act, or instruction used in the present application should be construed as critical or essential to the invention unless explicitly described as such. Further, the phrase "based on" is intended to mean "based, at least in part, on" unless explicitly stated otherwise.

What is claimed is:

1. A rod coupling remover device, the rod coupling remover device comprises:

a body having a top end, a bottom end, and a shaft opening running from the top end and the bottom end;

a bifurcated threaded portion about the bottom end of the body;

a retractable wedge;

a shaft opening running from a top end to a bottom end of the body; and

a threaded shaft member coupled to the retractable wedge at the bottom end of the body, the threaded shaft member passes through the shaft opening of the body in which the retractable wedge is movable into and out of the shaft opening of the body;

wherein the bifurcated threaded portion at the bottom end of the body is configured to be coupled within a mating set of threads in a rod coupling device having a sucker rod coupled to an opposite end of the rod coupling device;

wherein rotating the threaded shaft member causes the retractable wedge to move into the shaft opening of the body and causes the bifurcated threaded portion to expand corresponding to a width of the retractable wedge within the shaft opening; and

the expanding bifurcated threaded portion causes the attached rod coupling device to expand and disengage from the sucker rod.

2. The rod coupling remover device according to claim **1**, wherein the remover tool further comprises:

a tightening nut coupled around the threaded shaft member about the top end of the body, the tightening nut rotates about the threaded shaft to prevent movement of the retractable wedge once the retractable wedge is within the shaft opening of the body; and

an enlarging slit vertically positioned along the bifurcated threaded portion.

3. The rod coupling remover device tool according to claim **2**, wherein the retractable wedge enlarges the bifurcated threaded portion of the body as the retractable wedge enters the shaft opening into the body.

4. The rod coupling remover device tool according to claim **2**, wherein the bifurcated threaded portion of the body is configured to engage a rod coupling having a threaded cavity having a threaded diameter.

5. The rod coupling remover device tool according to claim **4**, wherein the bifurcated threaded portion has a threaded diameter of ¾", ⅞", or 1".

6. A method of separating a sucker rod from a rod coupling device, comprising:

inserting a rod coupling remover device into a threaded open end of the rod coupling device having the sucker rod coupled to the opposite end, the rod coupling device comprises:

a body having a top end, a bottom end, and a shaft opening running from the top end and the bottom end;

a bifurcated threaded portion about the bottom end of the body;

a retractable wedge;

a shaft opening running from a top end to a bottom end of the body; and

a threaded shaft member coupled to the retractable wedge at the bottom end of the body, the threaded shaft member passes through the shaft opening of the body in which the retractable wedge is movable into and out of the shaft opening of the body;

rotating the threaded shaft member causing the retractable wedge to move into the shaft opening of the body and causing the bifurcated threaded portion to expand corresponding to a width of the retractable wedge within the shaft opening; and

expanding the bifurcated threaded portion causing the attached rod coupling device to expand; and

disengaging the sucker rod from the rod coupling device.

7. The method according to claim **6**, wherein the remover tool further comprises:

a tightening nut coupled around the threaded shaft member about the top end of the body, the tightening nut rotates about the threaded shaft to prevent movement of the retractable wedge once the retractable wedge is within the shaft opening of the body; and

an enlarging slit vertically positioned along the bifurcated threaded portion.

8. The method according to claim **7**, wherein the retractable wedge enlarges the bifurcated threaded portion of the body as the retractable wedge enters the shaft opening into the body.

9. The method according to claim **7**, wherein the bifurcated threaded portion of the body is configured to engage a rod coupling having a threaded cavity having a threaded diameter.

10. The method according to claim **9**, wherein the bifurcated threaded portion has a threaded diameter of ¾", ⅞", or 1".

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