July 1, 1958 C. F. MOSELEY 2,841,423

STUFFING BOX WITH HELICALLY ARRANGED PACKINGS INSERTED FROM THE SIDE

Filed May 26, 1955 2 Sheets-Sheet 1

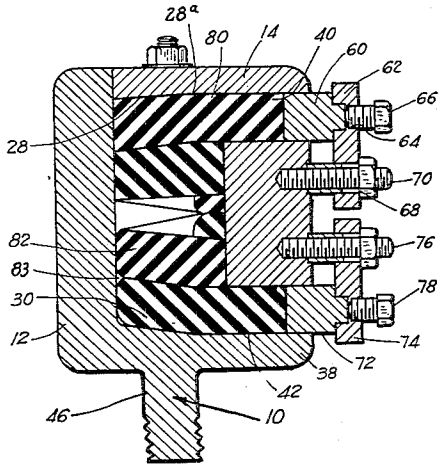


Fig. 1

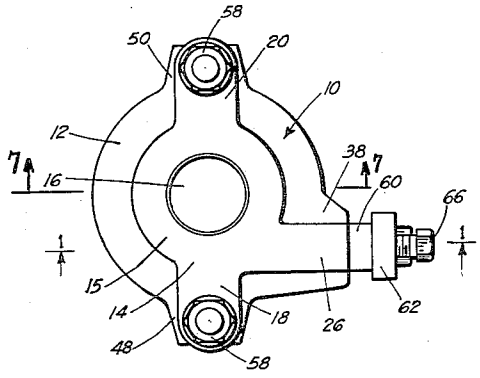


Fig. 2

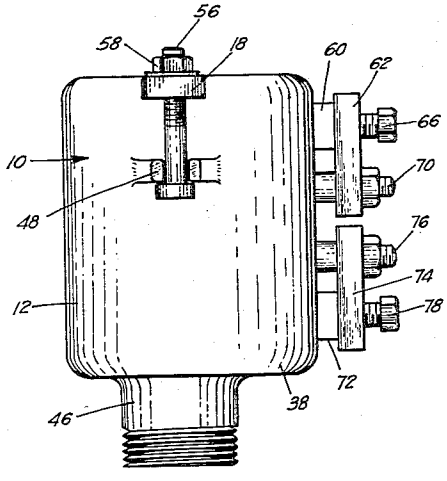


Fig. 3

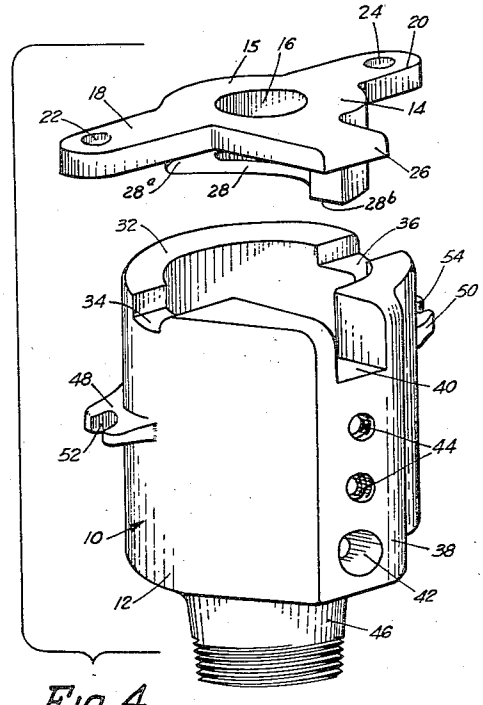


Fig. 4

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STUFFING BOX WITH HELICALLY ARRANGED PACKINGS INSERTED FROM THE SIDE

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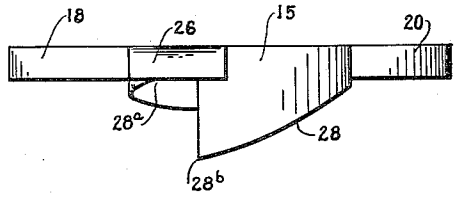


Fig. 5

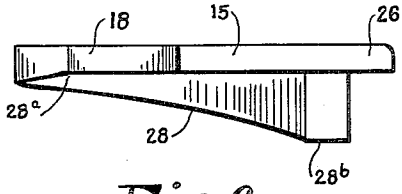


Fig. 6

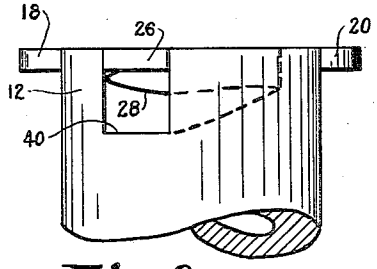


Fig. 8

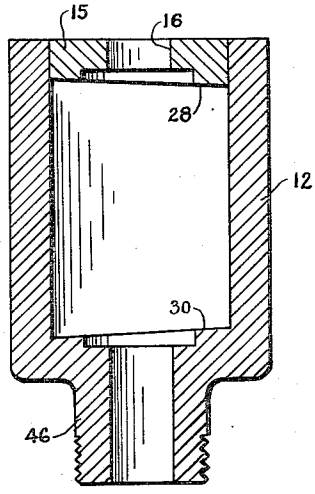


Fig. 7

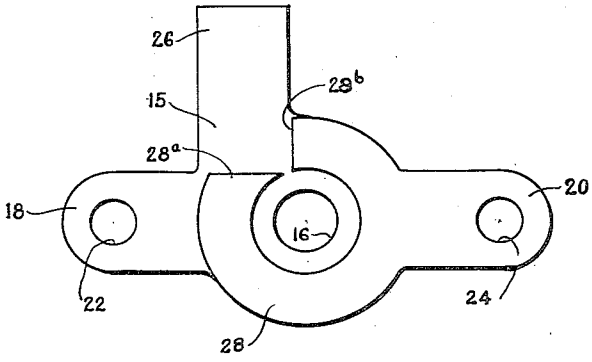


Fig. 9

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STUFFING BOX WITH HELICALLY ARRANGED PACKINGS INSERTED FROM THE SIDE

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Application May 26, 1955, Serial No. 511,339

5 Claims. (Cl. 286—38)

This invention relates to stuffing boxes, and more particularly, but not by way of limitation, to an improved stuffing box gland adapted for utilization around a polished rod of a producing oil well.

The majority of oil wells in the oil industry are pumped by use of a rod type pump. The pumping unit is installed in the proximity of the bottom of the well bore and is actuated from the surface of the ground by means of a string of rods. The rods are reciprocated within the bore hole to assist in lifting the oil therein to the surface. The uppermost section of rod is commonly called a polished rod and projects upwardly from the well head. A packing gland disposed in a stuffing box is normally secured to the well head around the polished rod in order to prevent leakage of the pumped well fluid therearound. The present day stuffing boxes are provided with a plurality of packing members which must be inserted longitudinally through the stuffing box into disposition around the polished rod and in sealing contact therewith.

It will be apparent that reciprocation of the polished rod within the stuffing box will cause the packing members to wear and become inefficient, often requiring replacement of the worn packings. To accomplish this, it is usually necessary to temporarily stop the actuation of the polished rod and disassemble the upper portion of the stuffing box in order to replace the inefficient glands or seals. In the event that the stuffing box is provided with two or more separate packing gland portions, it may be possible to replace the worn packing members without cessation of the operation of the polished rod. Even in this event, however, it is still usually necessary to disassemble the upper portion of the stuffing box in order to obtain access to the damaged packings. It will be apparent that replacement of the lowermost packing gland portion is a tedious and time consuming operation.

The present invention contemplates a novel stuffing box for utilization with a polished rod of a producing oil well, and which is so designed and constructed to greatly simplify the maintenance of packing glands therein. The novel stuffing box utilizes strips of packing which may be readily inserted into the interior of the box by means of openings provided in the side wall thereof. The lower inner surface of the stuffing box is provided with a spiral surface which guides an inserted packing strip upwardly in a spiral path for disposition around the polished rod. The inner surface of the cover member of the box is provided with a complementary oppositely disposed spiral surface to guide a second packing strip in a downwardly spiral path around the polished rod. As the two packing strips are brought into contact within the stuffing box they may be compressed into an efficient sealing position around the polished rod by means of plungers adapted for disposition in the side wall openings of the stuffing box. When the reciprocal action of the polished rod causes wear on the packing disposed therearound, it is an expedient matter to insert additional pieces or strips

of packing through the opening without stoppage of the rod or disassembly of the stuffing box.

It is, therefore, an important object of this invention to provide a novel stuffing box for utilization around a polished rod of a producing oil well, and which is so designed and constructed to facilitate efficient maintenance of packing glands to prevent leakage of well fluid therearound.

It is another object of this invention to provide a novel stuffing box for utilization around a polished rod of an oil well and which permits renewal of the packing glands utilized therewith without the necessity of cessation of the operation of the polished rod.

It is still another object of this invention to provide a novel stuffing box utilizing packing strips which may be expediently renewed without disassembly of the stuffing box.

It is a further object of this invention to provide a novel stuffing box which is adapted to provide adequate lubrication of the polished rod by utilizing the well fluid itself, thus precluding contamination thereof by foreign substances.

It is a still further object of this invention to provide a stuffing box for a polished rod of an oil well in which there is a spiral configuration provided to direct the packing for the box in a spiral direction around the polished rod in super-imposed layers to provide an efficient seal around the polished rod.

It is a still further object of this invention to provide a novel stuffing box which is economical and durable in construction and simple and inexpensive in operation.

Other objects and advantages of the invention will be evident from the following detailed description, read in conjunction with the accompanying drawings, which illustrate my invention.

In the drawings:

Figure 1 is a sectional view of a stuffing box embodying the invention and is taken on line 1—1 of Fig. 2.

Fig. 2 is a plan view of a stuffing box embodying the invention.

Figure 3 is a side elevational view of the novel stuffing box.

Figure 4 is an exploded perspective view of the stuffing box housing and cover.

Figure 5 is a side elevational view of the cover member.

Figure 6 is a side elevational view of the cover member taken at a ninety degree position from Fig. 5.

Figure 7 is a view taken on line 7—7 of Fig. 2 without the packing members.

Figure 8 is a broken view of the upper portion of the stuffing box with the cover in place and with portions shown in dotted lines for purposes of illustration.

Figure 9 is a plan view of the under side of the cover member particularly depicting the spiral member thereof.

Referring to the drawings in detail, reference character 10 refers in general to a stuffing box comprising a substantially cylindrical or tubular housing 12 and a cover member 14. The body 15 of the cover member 14 is of substantially circular configuration and is provided with a central aperture 16 (Fig. 4) which permits a polished rod (not shown) to extend therethrough. The cover 14 is further provided with a pair of oppositely disposed outwardly extending flanges or dog ears 18 and 20 each having an aperture 22 and 24, respectively, provided therein for a purpose as will be hereinafter set forth. The cover 14 is also provided with an outwardly extending arm 26 to cooperate with the housing 12 in a manner as will hereinafter be set forth. The under side of the cover 14 is provided with a downwardly projecting flange 28 of substantially spiral configuration (Fig. 4) which

extends into the interior of the housing **12** when the stuffing box **10** is assembled. The bottom of the housing **12** is provided with a similar spiral portion **30** (particularly shown in Fig. 1) which extends upwardly within the housing, and is oppositely disposed with respect to the spiral flange portion **28** (Fig. 1).

The top surface **32** of the housing **12** is provided with two diametrically opposed grooves or recesses **34** and **36** adapted to receive the dog ears **18** and **20**, respectively. The housing **12** is further provided with a longitudinally disposed outwardly protruding boss **38** having a substantially square shaped recess **40** at the top thereof in alignment with the extending member **26** of the cover **14** and of greater depth than the grooves **34** and **36** for a purpose as will hereinafter be set forth. The boss **38** is further provided with a lower circular bore or aperture **42** in substantial vertical alignment with the recess **40**. A plurality of apertures **44** are disposed in spaced relation between apertures **40** and **42**, and in alignment therewith. The lower end of the housing **12** terminates in a downwardly extending externally threaded sleeve **46** in alignment with the aperture **16** in the cover **14** to cooperate therewith to permit the polished rod (not shown) of a producing well (not shown) to be inserted through the housing **12**, as will hereinafter be set forth. (The aligned aperture of the sleeve **46** is not depicted in Fig. 1 because of the plane of the section from Fig. 2.) A pair of lug members **48** and **50** are provided on the outer periphery of the housing **12** and are disposed in spaced alignment with respect to the grooves **34** and **36**, respectively, in order to assist in retaining the cover **14** securely in position on the housing **12**.

The cover **14** may be positioned on the housing **12** with the dog ears **18** and **20** disposed within recesses **34** and **36**, respectively, and the arm **26** within the uppermost portion of the recess **40**. The apertures **22** and **24** will be in substantial alignment with complementary recesses **52** and **54** provided in the lugs **48** and **50**, thus permitting suitable bolts **56** and nuts **58** to be inserted therethrough to clamp the cover **14** securely on the housing **12**.

As hereinbefore set forth, the recess **40** of the housing **12** is of substantially greater depth than the recesses **34** and **36** so that upon assembly of the cover **14** with the housing **12** an aperture **41** is provided between the arm **26** and recess **40** to receive a substantially square shaped follower or plunger **60** (Figs. 1 and 2). The plunger is adapted to be carried by a rectangular plate **62** having an aperture **64** provided therein to receive a suitable threaded member **66** adapted to provide a means of moving the plunger longitudinally within the recess **40**. The plate **62** is further provided with an aperture **68** adapted to receive a threaded means **70** which cooperates with the uppermost aperture **44** in the housing **12** to maintain the plate **62** in a position substantially parallel to the boss **38**. A circular follower or plunger **72** is provided for disposition within the aperture **42** and a lower plate **74** similar to the upper plate **62** cooperates with the threaded members **76** and **78** and the lowermost aperture **44** in the housing **12** to maintain the plunger **72** within the aperture **42**. The aperture **40** in the housing **12** is adapted to receive strips of packing **80** (Fig. 1), of substantially square configuratiton, for insertion thereof into the interior of the housing, and the aperture **42** is adapted to receive a strip of packing **82** of substantially round or circular configuration for insertion thereof into the housing as will hereinafter be set forth.

Operation

The cover **14** is tightened securely on the housing **12** by means of the bolts **56** and nuts **58**, and the stuffing box **10** is disposed around a polished rod (not shown) in the usual manner so that the rod extends upwardly therethrough and the threaded sleeve **46** may be secured to the well head (not shown). The plungers **60** and **72** may be removed from disposition within the apertures **40** and **42**, respectively. The square shaped (in cross section) packing strip **80** may be inserted into the interior of the housing **12** through the aperture **40** and into contact with the downwardly spiraling flange **28** on the cover **14**. The member **28** will guide the packing strip in a spirally downward direction within the housing and around the outer periphery of the polished rod (not shown). It is to be noted in Fig. 4 that the spiral flange member **28** tapers from a substantial zero inclination at one end **28^a** to a depth substantially equal to the width of the packing strip at the opposite end **28^b**, thus facilitating the entry of the packing strip into the housing and providing for super-imposition of one layer upon another as the packing moves around the polished rod. The circular shaped (in cross section) packing strip **82** may be similarly inserted into the housing through the aperture **42** and the upwardly directed spiraling portion **30** adjacent thereto guides the packing **82** in a spirally upward direction around the polished rod and into contact with the square shaped packing **80**. The plungers **60** and **72** may be disposed within their respective apertures and the plates **62** and **74** assembled with the housing **12** as hereinbefore set forth. The plungers **60** and **72** may be forced against the exposed end of packing strips **80** and **82** by means of the threaded members **66** and **78** until the desired sealing efficiency around the polished rod is attained.

The circular shaped packing **82** disposed within the stuffing box **10** provides a small recessed portion **83** between the super-imposed convolutions, consequently, as the rod is reciprocated within the stuffing box **10** a small quantity of well fluid will enter the stuffing box and follow the spiral path in the recess **83** between the circular shaped packing **82** upwardly in the proximity of the upper square shaped packing member **80**, thus providing adequate lubrication between the polished rod and the packing glands. The square packing **80** is disposed so that the entire outer periphery thereof is in sealing contact with the inner periphery of the housing **12** and will thus have a tendency to preclude the passage of the well fluid upwardly therearound, and provide an efficiently sealed self-lubricating stuffing box. As the packing adjacent the polished rod becomes worn or substantially deteriorated through usage, additional strips of packing may be inserted through the apertures **41** and **42** and the plungers **60** and **72** may be utilized to properly compress the packing without the necessity of disassembly of the cover **14** from the housing **12** or without cessation of the actuation of the polished rod, it being understood that the newly inserted packing will compress against the worn packing without the necessity of removing the worn packing from the stuffing box **10**.

It will be apparent that the interior of the housing **12** may be filled with packing and the cover secured thereon prior to installation of the stuffing box around the polished rod. It is also anticipated that molded packing members of a spiral configuration substantially conforming to the inner spiral surfaces of the housing and cover may be provided for insertion into the interior of the housing through the top thereof prior to securing the cover thereon. The cover may then be secured on the housing and the polished rod may be forced upwardly through the packing upon the initial installation operation and further compression of the packing members may be obtained as heretofore set forth.

From the foregoing, it will be apparent that the present invention provides a novel self-lubricating stuffing box so designed and constructed to facilitate the maintenance of an efficient seal around the polished rod of a producing oil well. The novel stuffing box provides for insertion of packing strips through openings provided in the side wall of the housing, thus permitting replenishing of worn packing without disassembly of the stuffing box.

Further, the packing may be maintained in an efficient sealing condition with no necessity of stopping the operation of the pumping means. Thus, the present invention provides an efficient stuffing box of simple and durable construction and economical operation.

Changes may be made in the combination and arrangement of parts as heretofore set forth in the specification and shown in the drawings, it being understood that any modification in the precise embodiment of the invention may be made within the scope of the following claims without departing from the spirit of the invention.

I claim:

1. A stuffing box for an oil well polished rod comprising a tubular housing having an open top, a removable cover for the open top of the housing, a downwardly directed spiral flange provided on the cover and extending into the housing, an upwardly directed spiral shoulder provided within the bottom portion of the housing, an upper packing strip of substantially square configuration disposed in the housing around the polished rod and adjacent the downwardly directed spiral flange for urging the upper packing strip in a downward spiral path around the polished rod, a lower packing strip of substantially circular configuration disposed within the housing around the polished rod and adjacent the upwardly directed spiral shoulder for urging the lower packing member in an upwardly spiral path around the polished rod, said housing provided with means for inserting the packing strips through the side wall thereof, and means cooperating with the housing to compress the packing strips to provide an efficient sealing contact thereof against the outer periphery of the polished rod.

2. A stuffing box for an oil well polished rod comprising a tubular housing having an open end, a removable cover for the open end of the housing, a downwardly directed spiraling flange provided on the cover and extending into the housing, an upwardly directed spiraling shoulder provided within the lower portion of the housing, an upper packing strip of substantially square configuration disposed in the housing around the polished rod, a lower packing strip of substantially circular configuration disposed within the housing around the polished rod, said housing provided with means for inserting the upper packing strip through the side wall thereof and adjacent the downwardly directed spiral flange of the cover to be guided thereby in a spiral path around the polished rod, said housing further provided with means for inserting the lower packing strip through the side wall thereof and adjacent the upwardly directed spiral portion of the housing to be guided thereby in a spiral path around the polished rod into contact with the upper packing strip, and means cooperating with the housing for compressing the packing strips to provide an efficient sealing contact thereof against the outer periphery of the polished rod.

3. A stuffing box for an oil well polished rod comprising a tubular housing having an open top and adapted for disposition around the polished rod, a removable cover member for the open top of the housing likewise adapted for disposition around the polished rod, an upper packing strip of square configuration disposed within the housing around the polished rod, means integral with the cover to guide the packing strip in a downwardly directed spiral path around the polished rod, a lower packing strip of circular configuration disposed within the housing around the polished rod, means integral with the housing to guide the lower packing strip in an upwardly directed spiral path around the polished rod, said housing having apertured means in the side wall thereof to permit insertion of the packing strips, and means cooperating with the apertured means for compressing the packing strips to provide an efficient sealing contact thereof with the outer periphery of the polished rod.

4. A stuffing box for an oil well polished rod comprising a tubular housing having an open top and adapted for disposition around the polished rod, a cover member for the open top of the housing likewise adapted for disposition around the polished rod, means for rigidly securing the cover member to the housing, a downwardly directed spiraling flange member provided on the cover, a substantially rectangular aperture provided in the side wall of the housing in communication with the spiraling flange, a packing strip of rectangular configuration disposed around the polished rod, said rectangular packing strip adapted for insertion through the rectangular aperture and guided in a downwardly spiral path by the spiral flange, an upwardly directed spiraling portion provided in the bottom of the housing in an axial alignment with the downwardly directed spiral flange, a circular aperture provided in the side wall of the housing spaced from the rectangular aperture and in communication with the upwardly spiraling portion, a packing strip of circular configuration disposed around the polished rod, said circular packing strip adapted for insertion through the circular aperture and guided in an upwardly spiral path by the upward spiraling portion, and means provided in each of the apertures for compressing the packing members around the polished rod.

5. A stuffing box for an oil well polished rod comprising a tubular housing having an open top and adapted for disposition around the polished rod, a cover member for the open top of the housing likewise adapted for disposition around the polished rod, means for rigidly securing the cover to the housing, a downwardly directed spiraling flange member provided on the cover, a substantially rectangular aperture provided in the side wall of the housing in communication with the spiraling flange, a packing strip of rectangular configuration disposed around the polished rod, said rectangular packing strip adapted for insertion through the rectangular aperture and guided in a downwardly spiral path by the spiral flange, an upwardly directed spiraling portion provided in the bottom of the housing in axial alignment with the downwardly directed spiral flange, a circular aperture provided in the side wall of the housing spaced from the rectangular aperture and in communication with the upwardly spiraling portion, a packing strip of circular configuration disposed around the polished rod, said circular packing strip adapted for insertion through the circular aperture and guided in an upwardly spiral path by the upward spiraling portion, and means provided in each of the apertures for compressing the packing member around the polished rod, said means comprising a plunger slidably disposed in each aperture to bear against the end of the packing strip therein, a plate member provided for each plunger secured substantially parallel to the outer wall of the housing, threaded means extending through the plate members for moving the plungers into a tight engagement with the packing strips for compression of the packing strips.

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