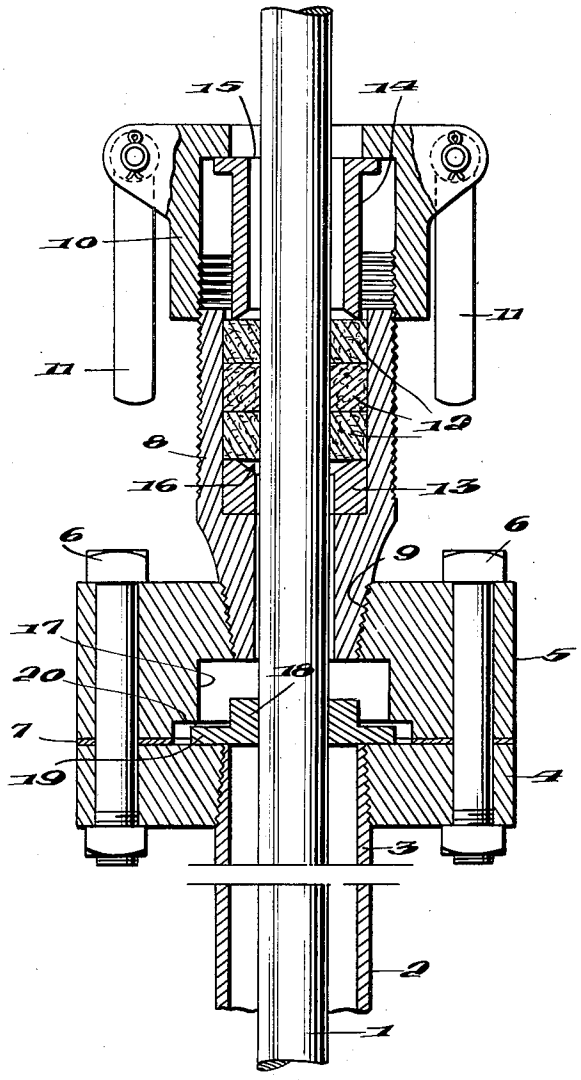
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STUFFING BOX

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STUFFING BOX

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This invention relates to improvements in stuffing boxes, and particularly to waste-retaining means therefor, adapted especially for collecting worn and broken particles of the stuffing box rings.

Stuffing boxes are customarily used on the polish rods of oil well pumps to seal off the tubing around the polish rod at the upper end of the well. The reciprocating movement of the polish rod through the stuffing box in the operation of the pump causes the packing to wear and particles thereof to be carried downward along the polish rod in the tubing. These particles collect in and around the balls in the valves of the pump in the lower portion of the well. When these valves become fouled they cease to function satisfactorily. Then it becomes necessary to remove them from the well. This task requires from one to several days' expense and loss of production, but has been required heretofore, with no satisfactory means provided for preventing the accumulation of the waste and particles from collecting in the pump.

An object of this invention is to eliminate the difficulties encountered heretofore, whereby the worn and broken particles of the stuffing box rings would follow along the polish rod and accumulate in the valves of the pump, by collecting and confining such particles and removing them from the region of the stuffing box without passage down along the polish rod to the pump.

A further object of the invention is to improve the construction of stuffing boxes by confining the packing against separation and following of particles from the packing along the polish rod to the pump valves and becoming separated from the stuffing box.

These objects may be accomplished according to certain embodiments of the invention by the provision of a recess in proximity to the stuffing box, either directly in the stuffing box itself or in a housing connected therewith to receive the particles broken or worn away from the stuffing box rings and separate these from the polish rod against following along the rod to the area of the valves. A retainer ring preferably is provided in or adjacent the recess, fitting loosely about the polish rod to remove the particles therefrom and confining these in the recess. This retainer ring cooperates with a separate ring that acts against the packing for holding the latter in place in the stuffing box, and together they form adequate provision for confining the packing and collecting any particles separating therefrom in a recess in the region of the

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stuffing box against the danger of following along the polish rod.

The invention is illustrated in one embodiment in the accompanying drawing, which is a vertical sectional view through a stuffing box and flanged union, showing one form of the invention.

Referring to the drawing, the invention is shown as applied to a portion of an oil well pump having a polish rod, generally designated at 1, adapted for reciprocating movement by a pump jack for operating the pump piston in the well. The polish rod 1 extends through a tubing 2 in the well. The upper end of the tubing 2 has a nipple 3 connected therewith.

The upper end of the tubing nipple 3 is shown as connected with a flanged union comprising lower and upper sections 4 and 5, respectively. The section 4 is shown as coupled directly to the tubing nipple 3, forming a tight joint therewith, while the section 5 is secured to the lower section 4 as by bolts 6. The union sections 4 and 5 preferably are separated by a gasket 7 interposed therebetween to form a tight joint.

The stuffing box is connected directly with the flanged union. This stuffing box includes a casing 8 having a threaded nipple 9 on the lower end thereof screw-threaded directly into the top of the union section 5 around the polish rod 1. The casing 8 has a collar 10 adjustably mounted on the upper end thereof, as by a screw-threaded connection with the housing, for vertical adjustment relative thereto. Handles 11 are pivotally connected with the collar 10 to facilitate adjustment of the latter.

Packing rings are shown at 12 in the stuffing box housing 8 and usually are formed of fiber or other non-metallic material. The packing rings 12 are seated upon a guide ring 13 and are confined by a follower ring 14 which acts on the uppermost packing ring 12. The ring 14 is confined by a shoulder 15 in the collar 10. Upon adjustment of the collar 10, the pressure of the follower ring 14 on the packing 12 may be varied or increased, as desired. The upper surface of the guide ring 13 is concave at 16 to increase the pressure on the packing rings 12, tending to compress the latter effectively against the periphery of the polish rod 1 so as to improve the effectiveness of the packing.

The flanged union 4—5 provides a housing having a recess 17 in the section 5 thereof at the lower end of the nipple 9 around the polish rod 1. This recess 17 forms an enlarged opening around the polish rod to receive therein any waste particles that may follow down the polish

rod from the packing 12. A waste retainer ring 18 surrounds the polish rod 1 within the recess 17, forming a relatively close fit on the periphery of the polish rod to prevent waste particles from passing through the recess 17 on the surface of the polish rod and to collect these particles in the recess.

This waste retainer ring 18 has a surrounding flange 19 received loosely in a groove 20 at the periphery of the recess, to allow the retainer ring 18 to float in the recess with the movements of the polish rod. Enough clearance is provided between the flange 19 and the groove 20 so as to allow the waste retainer ring 18 to be maintained in perfect alignment with the guide ring 13 and the compressed packing 12 thereabove. This will eliminate considerable wear on these metal parts.

The flanged union 4—5 may be formed as a casting, while the rings 13, 14 and 18 may be made of bronze, aluminum, or cast iron or other suitable metals. The packing rings 12 usually are of compressible packing material and may be compressed tightly in place in the stuffing box casing 8 by the adjustment of the follower ring 14, thus forming an effective packing and permitting the use of fibrous packing material without danger of accumulation of waste particles therefrom in the valves of the pump. Such particles are collected in the recess 17, being removed from the periphery of the polish rod by the waste retainer ring 18 as the polish rod reciprocates in the stuffing box. This prolongs materially the effective operation of the pump without the necessity of pulling the rods at frequent intervals, and saves the long delay which has been required heretofore resulting in both a loss of production and a considerable expense that is eliminated effectively to a very large extent by this invention.

The invention may be used in connection with any desired form of stuffing box, or other packing device, and is not restricted to the forms illustrated and described. This retaining ring particle accumulation may be used in cooperation with a separate packing device or incorporated therein, as desired.

While the invention has been illustrated and described in certain embodiments, it is recognized that variations and changes may be made therein without departing from the invention, except as set forth in the claims.

I claim:

1. A stuffing box comprising a casing having a packing ring therein adapted to receive a reciprocating polish rod therethrough, a housing connected to said casing, said housing having an annular recess provided and an annular groove

formed in a face thereof, said recess and said groove being coaxially aligned with said packing ring, a centrally apertured plate secured to said housing, said plate having a side thereof spaced from and parallel to one side of said groove, and a flanged waste retainer ring slidably mounted on said polish rod within said recess to remove particles of said packing ring from said rod for deposit within said recess, said flange extending between said parallel sides of said groove and having a diameter less than the diameter of said groove, and said flange having a thickness less than the axial dimension of said groove, whereby said flange waste retainer ring is free to move in said groove with the movement of said reciprocating polish rod.

2. A stuffing box comprising a casing having a packing ring therein adapted to receive a polish rod therethrough, said rod having reciprocating movement, a housing connected with said casing, said housing having an annular recess and a groove formed in a face thereof, said recess and said groove being coaxially aligned with respect to said ring, and a waste retainer ring mounted on said rod within said recess to remove particles of said packing ring from said polish rod for deposit within said recess, said waste retainer ring having a peripheral flange extending within and being confined by said groove, said flange having a diameter less than the diameter of said groove and having a thickness less than the axial dimension of said groove, whereby said flanged waste retainer ring is free to move laterally with said rod within the confines of said groove with the movement of said polish rod.

3. A stuffing box as defined in claim 2, and said groove formed in said housing being disposed on one side of said recess and communicating therewith.

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