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RAM-TYPE BLOWOUT PREVENTER

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The present invention relates to ram-type blowout preventers. In particular the invention relates to a ram-type blowout preventer having a body with a central bore and guideways extending outwardly therefrom with rams movable therein and with means to compensate for wear in the ram guideways or in the ram to ensure that the ram seals are held against the upper interior surface of the guideways.

An object of the present invention is to provide an improved ram-type blowout preventer which ensures the ram top and side seals are effective independent of wear of the rams and guideways.

According to the present invention there is provided a ram-type blowout preventer including a body having a central bore extending therethrough and opposed aligned ram guideways extending outward from said central bore, a ram in each guideway, means for moving said rams between a bore closing position and a retracted position out of said bore, and characterized by replaceable means on each of said rams to compensate for wear of said guideways or rams and to maintain said rams in their desired position in their guideways.

The invention will be described now by way of example only with particular reference to the accompanying drawings. In the drawings:-

FIGURE 1 is an elevation view (partly in section) of the improved blowout preventer of the present invention.

FIGURE 2 is a partial sectional and elevation view of a portion of the improved blowout preventer of the present invention.

FIGURE 3 is an end elevation view of one form of improved ram of the present invention.

FIGURE 4 is a sectional view taken along line 4-4 in FIGURE 3.

FIGURE 5 is a view of the front of another form of improved ram of the present invention..

FIGURE 6 is a view of the rear of a modified form of improved ram of the present invention.

FIGURE 7 is a bottom view of the ram shown in FIGURE 6.

FIGURE 8 is a bottom view of the insert skid used on the ram shown in FIGURES 6 and 7.

FIGURE 9 is a sectional view of the insert skid taken along line 9-9.

In FIGURE 1, blowout preventer 10 is shown having body 12 through which central bore 14 extends with opposed aligned guideways 16 extending outward from bore 14. Ram 18 is moved in guideway 16 by suitable actuator 20 connected to ram 18 by connector rod 22. Ram 18 includes the usual ram front packer 24 and sealing element 26 which extends along the sides and across the top of ram 18 and seals against the interior of guideway 16.

The ram 18 shown in FIGURES 3 and 4 has the front packer slot 25 and a lower mud slot 28. Skids 30 and shims 32 are mounted in mud slot 28 by cap screws 34 which extend through end flanges 36 and shims 32. With different thicknesses of shims 32 or the use of multiple shims 32 compensation is provided for the wear of the lower surface of guideways 16 or the surface of skids 30 to ensure that sealing elements 26 are

maintained in sealing engagement with the upper interior of guideways 16.

Another form of the improved blowout preventer ram of the present invention is shown in FIGURE 5 as ram 38 which has the usual mud slot 40 extending from front to rear on its lower side but formed by skids 42 secured to its lower side. Skids 42 are shaped to conform to the shape of the guideways in which they are to be used and are secured to ram 38 by suitable fastening means, such as cap screws 44, with at least two or more being used to secure each of skids 42. As with the previously described form, shims 46 are positioned between skids 42 and the lower side of ram 38. With different thicknesses of shims 46 or with the use of multiple shims 46, skids 42 can be adjusted to compensate for wear of the guideways or of skid surfaces 43, and to ensure that its top and side sealing element are properly positioned for sealing.

Another form of the present invention is shown in FIGURES 6 and 7 as ram 50. Ram 50 has an exterior shape to fit closely in the guideway in which it is to be installed. Slot 52 across the rear of ram 50 is provided for the attachment of the connecting rod (not shown). Recess 54 on the front face of ram 50 is provided to receive tubular members therein.

Mud slot 56 on the lower surface of ram 50 includes rear recess 58 and forward slot 60 which is narrower than recess 58 as shown in FIGURE 7. Skid 62 is positioned in recess 58 and extends into slot 60. Skid 62 includes body 64 with Y-shaped slot 66 extending therethrough as shown with the double slots 68 opening on the rear. Skid 62 is secured to ram 50 by

screws 70 which are positioned in recesses 72. The heads of screws 70 are positioned wholly within recesses 72 so that they never engage the guideway in which ram 50 is positioned. To adjust for wear one or more shims 74 is positioned in slot 56. Skid 62 provides a pair of side skid surfaces 76 and triangular skid surface 78.

It is suggested that screws 34, 44 and 70 be made of a high strength non-galling material such as the thermoplastic polyester sold by E.I. du Pont de Nemours under the trademark "RYNITE" or the nylon sold by the same company under the trademark "ZYTEL", to avoid scarring of guideways 16 in the event a screw works loose. An alternate structure for preventing galling damage from a loose fastener would be to cap the head of the fastener with a non-galling material, such as a polytetrafluoroethylene so that if it becomes loose the head will readily slide with the movement of the ram and will not scar the guideway.

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CLAIMS

1. A ram-type blowout preventer including a body having a central bore extending therethrough and opposed aligned ram guideways extending outward from said central bore, a ram in each guideway, means for moving said rams between a bore closing position and a retracted position out of said bore, and characterized by replaceable means on each of said rams to compensate for wear of said guideways or rams and to maintain said rams in their desired position in their guideways.

2. A ram-type blowout preventer according to claim 1 wherein said wear compensating means includes at least one replaceable wear skid secured to each of said rams to maintain the rams in position in their guideways with their guideway seals sealing against the interior of their guideways.

3. A ram-type blowout preventer according to claim 1 wherein said ram has a lower surface and wherein said wear compensating means includes at least one skid secured to the lower surface of said ram, and at least one shim positioned between the skid and the ram.

4. A ram-type blowout preventer according to

claim 1 wherein said ram has a lower surface and wherein said wear compensating means includes two skids secured to the lower surface of said ram.

5. A ram-type blowout preventer according to claim 4 wherein said ram includes a lower mud slot, and said skids are mounted in said mud slot.

6. A ram-type blowout preventer according to claim 4 wherein said skids are mounted to the lower ram surface at each side thereof and define a mud slot therebetween.

7. A ram-type blowout preventer according to claim 1 wherein said ram has a lower surface and wherein said wear compensating means includes a skid secured to the lower surface of the ram, said skid being adjustable in position to compensate for wear.

8. A ram-type blowout preventer according to claim 7 wherein said skid includes a body having a Y-shaped recess on the lower surface.

9. A ram-type blowout preventer according to claim 8 wherein said position adjustment includes at least one shim positioned between the skid and the ram.

10. A ram-type blowout preventer according to claim 1 wherein said wear compensating means includes fastening means for securing said wear compensating

means to said rams, said fastening means being of a non-galling material.

11. A ram-type blowout preventer according to claim 1 wherein said wear compensating means includes fastening means for securing said wear compensating means to said rams, said fastening means having a head, and means covering the head of said fastening means with a non-galling material.

12. A ram-type blowout preventer substantially as hereinbefore described and as shown in the accompanying drawings.