

free to expand to fully open the generally central passage and the insert 254 to be removed.

Also shown in Figure 5, is a set of hydraulically operated pins 262 or bolts carried by the housing 248 so that, when moved inwardly, they provide a
5 landing shoulder in the housing generally central bore or passage 214 to position the insert packer 254 opposite the actuator 258. A second set of hydraulically operated pins 264 carried by the housing are adapted to be moved into an annular groove 266 about the insert packer 254 to lock the insert packer in place to prevent its up or down movement in the generally
10 central bore or passage 214. An upward pull on the drill string 32 can confirm the lock down of the insert packer 254. The annulus between the housing generally central bore or passage 214 and the insert packer 254 may be sealed off by contraction of the actuator sleeve 258 by means of fluid pressure supplied to the recess 250 about the sleeve to close about the drill string 32 to
15 seal off well fluid in the annulus above and below it. The pressure is such as to allow the drill string and its tool joints to pass through it while maintaining a seal (stripping) in either direction. The actuator 258 also includes metal rings 268 at both ends of sleeve 260, each carrying a seal ring (not shown) thereabout to seal off the recess 250 to contain actuating fluid in the recess
20 250.

This patent proposes a retrievable 'packing insert' that is a custom component of the 'riser isolation tool'. A problem with this solution is that it requires a custom installation of the riser isolation tool that limits the use of this packing insert to that type of subsea installation as described in the patent.

25 SUMMARY OF INVENTION

According to one aspect of the invention, there is provided a blowout preventer assembly comprising an annular blow out preventer having an annular packing unit and an actuator operable to reduce the internal diameter of the annular
30 packing unit, the assembly further comprising a stripping sleeve having a

5 | tubular elastomeric sleeve which in use is positioned generally centrally of the packing unit so that the packing unit surrounds at least a portion of the elastomeric sleeve, characterized in that the actuator comprises a piston movable generally parallel to the longitudinal axis of the blowout preventer by the supply of pressurised fluid to the annular blow out preventer.

10 | Herein disclosed is~~According to a first aspect of the invention we provide a~~ blowout preventer assembly comprising an annular blowout preventer having an annular packing unit and an actuator operable to reduce the internal diameter of the annular packing unit, wherein the assembly further comprises a stripping sleeve having

a tubular elastomeric sleeve which in use is positioned generally centrally of the packing unit so that the packing unit surrounds at least a portion of the elastomeric sleeve.

This design results in a substantial elastomeric material thickness available for wear during operational use. This may assist in preserving the integrity of the blowout preventer for normal operations by not wearing its element. The stripping sleeve is thus a wearable, disposable item that needs to be designed to be easily inserted and removed from operation.

As mentioned in the above aspect, ~~The actuator may comprises~~ a piston movable generally parallel to the longitudinal axis of the blow out preventer by the supply of pressurised fluid to the annular blow out preventer.

Advantageously, the stripping sleeve further comprises two annular support parts, the elastomeric sleeve being positioned between the two support parts.

The outer diameter of each of the support parts may be greater than the outer diameter of the elastomeric sleeve. In this case, the annular packing unit may comprise an elastomeric body and at least one generally rigid insert, the insert lying at least partially between the two annular support parts when the annular packing unit engages with the elastomeric sleeve. Furthermore, the annular packing unit may comprise first and second generally rigid, maybe metallic, inserts, the elastomeric body lying between the first and second inserts and the first insert being at a first end of the annular packing unit adjacent to one of the support parts and the second insert being at a second end of the annular packing unit adjacent to the other of the support parts, both inserts lying at least partially between the two support parts when the packing unit is engaged with the elastomeric sleeve.

The inner diameter each of the support parts may be substantially the same as the inner diameter of the elastomeric sleeve.

Each support part may be provided with a circular ridge which extends into an end of the elastomeric sleeve.

Advantageously the maximum outer diameter of the stripping sleeve is less
5 than the inner diameter of the annular packing unit when the packing unit is not acted on by the actuator.

By virtue of this, it is possible that the stripping sleeve does not permanently affect the bore of the system or the integrity of the blowout preventer or its packing unit. Moreover, the stripping sleeve can be applied easily on the most
10 common wellbore configurations in use today for drilling and can be easily delivered into the wellbore for operations.

In certain embodiments of the invention, the stripping sleeve further comprises a polymeric sealing element which is arranged radially inwardly of the elastomeric sleeve. In this case, the polymeric sealing element may contain a
15 plurality of apertures into which the elastomeric sleeve extends.

Also disclosed is~~According to a second aspect of the invention we provide a~~
blow out preventer assembly including two annular blow out preventers and stripping sleeves having any of the features set out above, wherein the two
20 annular blow out preventers are arranged around a common central passage and are longitudinally displaced with respect to one another along the common central passage, and the two stripping sleeves are connected by means of a tubular connector.

25 In this case, the packing units and actuators of the annular blow out preventers may be contained in a housing which encloses the common central passage, there being a conduit provided in the housing to connect the volume of the common central passage between the two annular blow out preventers with the exterior of the housing.

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Further disclosed is ~~According to a third aspect of the invention we provide a~~
method of operating a blow out preventer assembly according to the second
aspect of the invention, the blow out preventer assembly being subjected to
fluid at a first pressure at a first end of the assembly and to fluid at a second
5 pressure at a second end of the assembly, the method comprising connecting
to the conduit provided in the housing to fluid at a third pressure, the third
pressure being higher than the first pressure and lower than the second
pressure.

10 This makes use of the fact that experience with annular preventers over the
years has shown that lower rates of wear of the elements are experienced with
lower well pressures. In this way the wellbore pressure can be staged down to
reduce the overall pressure drop across each stripping sleeve. This may
further enhance the longevity of the stripping sleeves. Such a system may also
allow detection of leakage of any of the elements.

15 Such a method also allows the staging through of the larger diameter tool-
joints as it is well known to those skilled in the art of stripping that leaks are
most likely to occur when stripping with a change in diameter of the tubular.
Having two stripping sleeves spaced further apart than the total tool-joint
length further enhances the pressure retaining properties of the system
20 disclosed.