A leak containment device for a well-head includes a resilient hollow inverted frusto-conical upper section having a narrow end at a lower end of the upper section and an annular collar mounted to the lower end of the upper section so as to extend downwardly therefrom. The upper section and the collar co-axial are about a substantially vertical axis of symmetry when mounted on the well-head. A spigot is mounted in fluid communication with, so as to extend from a side of the lower end. A contiguous separable seam is formed in the upper section and the collar so as to allow resiliency deformation of the upper section and the collar to open the seam into an open position for passage of the well-head into the upper section and the collar. The collar is sized for snug mating engagement around the well-head when the seam is resiliently returned to, and releasably locked in a closed position wherein the seam is closed fluid-tight so as to inhibit fluid leakage through the seam.
PRIMARY LEAK CONTAINMENT DEVICE FOR WELL-HEADS

FIELD OF THE INVENTION

[0001] This invention relates to a primary leak containment device for collecting and diverting spilled liquid from the stuffing box during operation of a reciprocating pumping device or ‘pump-jack’ system as is commonly employed, for example, in the oil recovery industry. More specifically, it is an inverted truncated conical shaped receptacle or funnel, adapted to be readily secured in a generally fluid tight aspect around a wellhead, below the top of the stuffing box, and having a fluid outlet aperture formed near its lower end and an external spigot surrounding the aperture.

BACKGROUND OF THE INVENTION

[0002] A common problem encountered during the operating of a reciprocating pumping device or ‘pumpjack’ system is the frictional wear and associated fluid leakage at the stuffing box. Generally, the stuffing box is positioned on top of the wellhead and surrounds the polish rod to provide a fluid tight seal to prevent fluid leaking. Over time the seal within the stuffing box wears and loses its effectiveness with the resultant loss of liquid from the well.

[0003] Such leakage may initially be of a small volume and continue for an extended period of time until the increase in leakage volume warrants maintenance of the stuffing box. This leakage unless contained, can eventually result in a substantial volume being spilled from the wellhead. As a result there is an expense associated with cleaning and maintaining the wellhead in a safe working condition and a further expense associated with required environmental site cleanup through the disposal of the surrounding contaminated soil.

[0004] The primary leak containment device of the present invention is simple to use and easy to install and requires little or no maintenance. The device may be installed on a wellhead at the time of pumping commencement and may be left in place for the duration of production thereby preventing any quantity of liquid escaping from the stuffing box fouling the wellhead or surrounding soil.

[0005] In the prior art the applicant is aware of U.S. Pat. No. 6,286,593 which issued Sep. 11, 2001 to Holby for an Oilwell Leak Containment Device for a Completed Oilwell. This device is a shallow segmented pan where coupling means is located within the pan and drainage aperture is provided within a segment of the pan allowing a passage of liquid to a second container or tray.

[0006] The applicant is also aware of U.S. Pat. No. 5,121,794 which issued Jun. 16, 1992 to Hibidon et al. for a Waste Fluid containment and Recovery Apparatus, wherein a pan is secured to a wellhead by bolting through the pan into the wellhead.

[0007] The applicant is also aware of U.S. Pat. No. 4,530,397 which issued Jul. 23, 1985 to Calhoun for an Oil Saving Apparatus for use with Well Pump Polish Rod, wherein a housing may be secured to the upper end of a stuffing box and enclosing the polish rod to collect and divert leaked fluid from the stuffing box.

[0008] The simplicity of design of the present invention is neither taught nor suggested.

SUMMARY OF THE INVENTION

[0009] The primary leak containment device of the present invention may be a conical shaped receptacle or funnel having an integrally formed annular collar depending from its narrow end. The device may be manufactured from a somewhat flexible, resiliant or semi-rigid material such as, without intending to be limiting, sheet steel or plastic. The containment device has a single contiguous split through both conical receptacle and cylindrical collar, thereby forming adjacent edges. The split side allows the adjacent edges of the receptacle to be manually expanded so as to permit placement of the leak containment device around, the associated polish rods and stuffing box of the wellhead. Suitable closure devices such as, for example, quick release, adjustable ‘over-center’ latches affixed adjacent to the split edges of the receptacle and depending collar tightly draw the split sloping side edges together and enable the collar to be secured about the wellhead in a fluid tight manner.

[0010] A fluid outlet aperture is provided near the lower (narrow) end of the receptacle, in proximity to the depending collar, to facilitate easy drainage of a quantity of liquid from the primary leak containment device to a secondary liquid storage container. The spigot may be provided with threads or a suitable quick release coupling so that a closure device such as a cap can be readily attached so that the flow of liquid from the primary receptacle may be interrupted permitting the emptying or exchanging of a secondary device without spillage of fluid. Alternatively, where a hose or other suitable extension is attached to the spigot alternative closure means may be employed.

[0011] The ease with which this device can be installed on a wellhead encourages its continuous use during the production and servicing operation.

[0012] Thus, summarized, the primary leak containment device for wellheads according to one embodiment of the present invention may be characterized as including:

[0013] a) a liquid receiving receptacle which is releasably mountable to a wellhead and in one embodiment may be conical or funnel shaped with a depending annular cylindrical collar at its narrow (lower) edge, both collar and sloping side of the receptacle having a contiguous split thereby forming adjacent edges in both collar and sloping side. The liquid receiving receptacle may be manufactured from semi-rigid material so as to be readily deformable to accommodate placement around associated polish rods and stuffing box on a wellhead.

[0014] b) a liquid receiving receptacle where adjacent edges on the sloping side of the receptacle and on the depending collar are secured in a liquid tight aspect by a plurality of suitable adjustable closure latches which are easily accessible on the external under surface of the receptacle.

[0015] c) a liquid receiving receptacle having a fluid outlet aperture provided near the lower (narrow) end of the receptacle in proximity to the depending collar and an external spigot extending coaxial with the outlet aperture.

[0016] d) a liquid receiving receptacle having an external spigot extending from the under surface of the
receptacle to which suitable closure means for interrupting the discharge of liquid from the receptacle may be secured.

[0017] In summary, the present invention may be characterized in one aspect as a leak containment device for a well-head, the container device including a resilient hollow inverted frusto-conical upper section having a narrow end at a lower end of the upper section and an annular collar mounted to the lower end of the upper section so as to extend downwardly therefrom, and so that the upper section and the collar co-axial are about a substantially vertical axis of symmetry when mounted on the well-head.

[0018] A spigot is mounted in fluid communication with, so as to extend from a side of the lower end. A contiguous separable seam is formed in the upper section and the collar so as to allow resilient deformation of the upper section and the collar to open the seam into an open position for passage of the well-head into the upper section and the collar.

[0019] The collar is sized for snug mating engagement around the well-head when the seam is resiliently returned to, and releasably locked in, a closed position wherein the seam is closed fluid-tight so as to inhibit fluid leakage through the seam.

[0020] The seam may be substantially linear and substantially vertical when the device is mounted on the well-head.

[0021] The seam may be an overlap seam further comprising a gasket mounted within the seam to one edge of the seam for sealing the seam when in the closed position. The means for releasably locking the seam may include at least one releasable latch mounted across the seam.

[0022] The collar may further include an annular gasket mounted within the collar for fluid-tight sealing engagement around the well-head.

BRIEF DESCRIPTION OF THE DRAWINGS

[0023] FIG. 1, is a simplified depiction of a ‘pump-jack’ system with the liquid receiving receptacle installed.

[0024] FIG. 2 is an enlarged view in section of the liquid receiving receptacle mounted to a well-head.

[0025] FIG. 3 is a perspective view of the receptacle FIG. 4 is an enlarged sectional view taken on line 44 of FIG. 3

DETAILED DESCRIPTION OF EMBODIMENTS OF THE INVENTION

[0026] With reference to the drawing figures, wherein similar characters of reference denote corresponding parts in each view, a pumping unit 10 reciprocates a polish rod 12 through a stuffing box 16 mounted to the upper portion 20a of a wellhead 20. Packing material 22 within stuffing box 16 eventually wears due to the reciprocating action of rod 12, resulting in an undesirable fluid leak.

[0027] The primary leak containment device 26 of the present invention is clamped to the upper portion 20a of wellhead 20, below stuffing box 16, to intercept and collect leaking fluid before it contaminates the wellhead or the soil surrounding the well site.

[0028] Leak containment device 26, in one form, may be in the form of a truncated cone having a uniformly downward and inwardly sloping side 28. A cylindrical collar or sleeve 30 depends from the bottom of the receptacle. Both sloping side 28 and collar 30 are split along a common axis, as at 34 shown in FIG. 3, creating opposing edges 38. Such split permits outward separation of the edges 38 for ease of placing device 26 around polish rod and stuffing box 12 and 16 respectively and positioning it on to the wellhead 20. A plurality of quick release closure latches 42, for example, may be employed to retain opposing edges 38 in a fluid tight aspect and to also position the receptacle 26 firmly onto wellhead 20.

[0029] As may be viewed in FIG. 4, edges 38a and 38b of the primary leak containment device 26 may be drawn in an overlapping aspect by the operation of latches 42. Further, a gasket 46 or the like may be employed adjacent opposing edges 38 and also around the inside surface of collar 30 to provide a fluid tight seal.

[0030] A fluid outlet aperture 50 is provided adjacent to depending collar 30 to allow gravity extraction of fluid from receptacle 26. An external spigot 52 extending coaxially outwardly of aperture 50 directs such fluid into a secondary receptacle 54. Spigot 52 may have threads 58 so that a cap 60 or the like can be attached thereto for interrupting the discharge of liquid from receptacle 26 so that secondary receptacle 54 can be emptied or replaced. Alternatively, a hose 64 or other extension means may be secured to spigot 50 to direct the discharge from device 26 to secondary receptacle 54.

[0031] As will be apparent to those skilled in the art in the light of the foregoing disclosure, many alterations and modifications are possible in the practice of this invention without departing from the spirit or scope thereof. Accordingly, the scope of the invention is to be construed in accordance with the substance defined by the following claims.

What is claimed is:

1. A leak containment device for a well-head comprising:
   a resilient hollow inverted frusto-conical upper section having a narrow end at a lower end of said upper section, an annular collar mounted to said lower end of said upper section so as to extend downwardly therefrom, said upper section and said collar co-axial about a substantially vertical axis of symmetry when mounted on the well-head,
   a spigot mounted in fluid communication with, so as to extend from a side of said lower end,
   a contiguous separable seam formed in said upper section and said collar so as to allow resilient deformation of said upper section and said collar to open said seam into an open position for passage of said well-head into said upper section and said collar,
   said collar sized for snug mating engagement around said well-head when said seam is resiliently returned to a closed position wherein said seam is closed fluid-tight so as to inhibit fluid leakage through said seam,
   means for releasably locking said seam in said closed position.
2. The device of claim 1 wherein said seam is substantially linear.

3. The device of claim 2 wherein said seam is substantially vertical when the device is mounted on the well-head.

4. The device of claim 3 wherein said seam is an overlap seam further comprising a gasket mounted within said seam to one edge of said seam for sealing said seam when in said closed position.

5. The device of claim 4 wherein said means for releasably locking said seam includes at least one releasable latch mounted across said seam.

6. The device of claim 5 wherein said collar further includes an annular gasket mounted within said collar for fluid-tight sealing engagement around the well-head.

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