Feb. 16, 1932. G. SAUNDERS 1,845,683

OIL SAVER

Filed May 4, 1931

Fig. 1

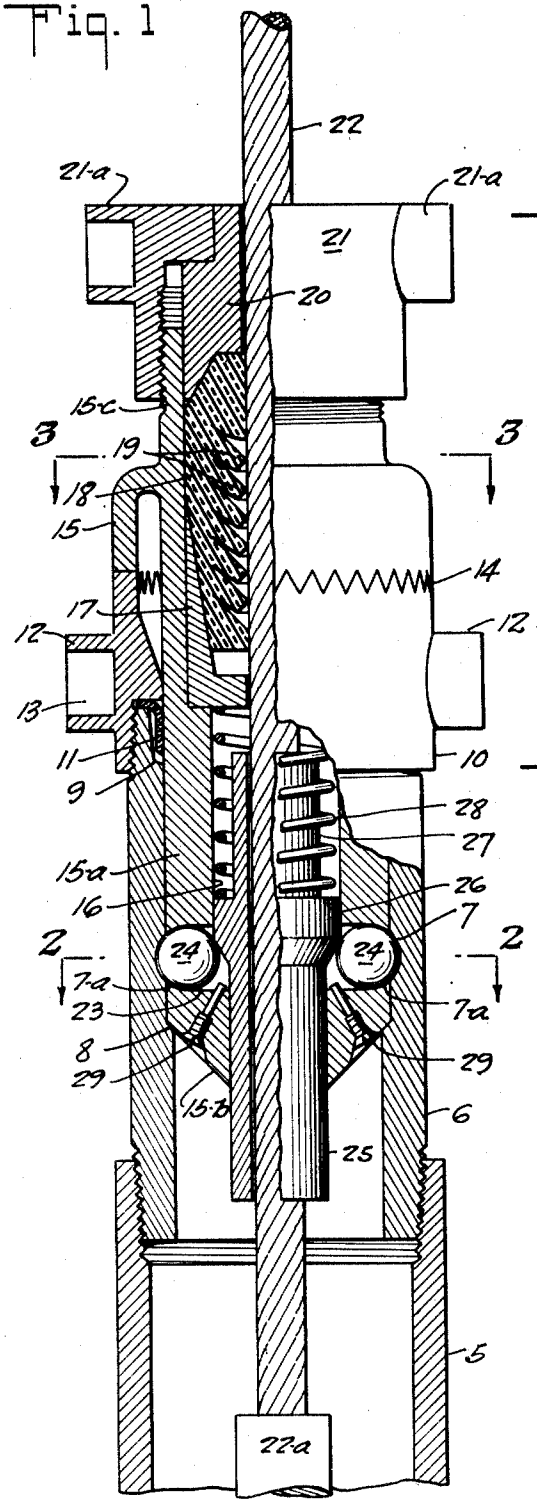


Fig. 2

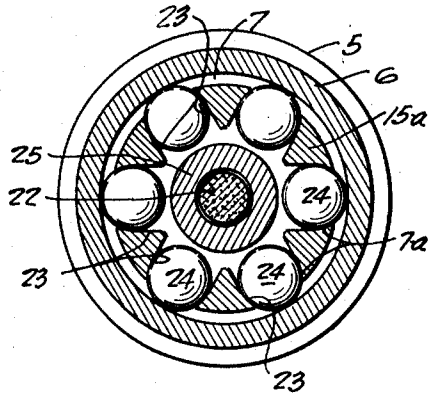
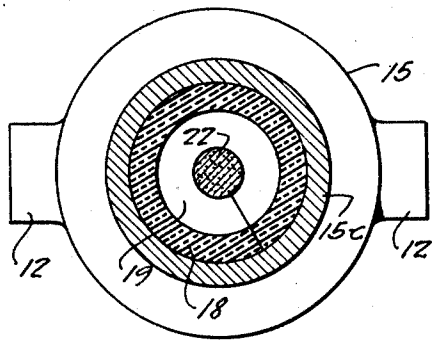


Fig. 3



INVENTOR
Gordon Saunders
BY
Westall and Wallace
ATTORNEYS

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UNITED STATES PATENT OFFICE

GORDON SAUNDERS, OF WHITTIER, CALIFORNIA

OIL SAVER

Application filed May 4, 1931. Serial No. 534,872.

This invention relates to an oil saver provided for closing the top of a well casing or tubing and enabling a cable or like string to be run therethrough. It is particularly useful for the purpose of running a device such as bailer or swab in the well and permitting outflow of oil through the usual flow pipe connected to the bore of the casing. To avoid damage due to the bailer or swab striking the head of the oil saver or a socket on the cable striking and also to enable the bailer or swab to be pulled from the casing, oil savers have been provided with releasable caps. Cap locking mechanism has been provided to secure the cap to the base of the oil saver, and release of the cap is effected by any swell on the cable engaging and operating the lock mechanism so as to release the cap. Such locking mechanism has commonly comprised triggers or fingers which occupy a considerable amount of space, are not sturdy and become stuck. Furthermore, the triggers or fingers become detached through accident and wear, falling upon the workmen and injuring them. The present invention has for its primary object the provision of a novel locking mechanism which is compact and sturdy. Another object of this invention is to provide an oil saver having a catch comprising balls. A further object of this invention includes details of structure such that the locking parts are retained against accidental detachment.

These objects are accomplished by means of the embodiment of my invention illustrated in the accompanying drawings, in which:—

Fig. 1 is a vertical axial section through an oil saver; and Fig. 2 is a section as seen on the line 2—2 of Fig. 1.

Fig. 3 is a sectional view of the device shown in Fig. 1 taken along the line 3—3 looking in the direction indicated.

Referring more particularly to the drawings, 5 indicates a fragment of a well casing string to the upper end of which is secured a sleeve section 6 forming a part of the oil saver. An annular keeper groove 7 is formed on the wall of the bore and a shoulder 8 for seating of a cage thereon. The upper end of the sleeve section 6 is externally threaded for attachment of a marginal sleeve section and is counterbored as indicated by 9 to accommodate a packing leather. Mounted upon the upper end of the sleeve is a marginal sleeve section 10, between which and the end face of the sleeve is clamped a packing leather 11. Laterally extending bosses 12 with sockets 13 are formed upon the section 10 and provide convenient means for handing the oil saver. The top edge of the marginal sleeve portion is serrated at 14.

The cap comprises a brim 15 having a serrated edge to mesh with the edge on the marginal sleeve portion. A tubular cage 15*a* forms a part of the cap and depends therefrom. The cage 15*a* slidably fits within the bore of the sleeve and has a lower tapered face 15*b* which seats upon the shoulder 8. The cage 15*a* and sleeve are packed by leather 11. The cage is extended above the brim as indicated by 15*c* and is threaded externally. The bore of the cage has a retainer housing section 16 reduced in diameter at the lower portion to form a seat for the retainer. At the upper end the bore of the cage is enlarged to form a stuffing box pocket. A thimble 17 has a tapered inner wall for an elastic packing bushing 18. The bushing 18 is preferably made of rubber having an outer wall tapered to coact with the corresponding tapered wall of thimble 17. A bore is provided through the packing and the wall of the bore has annular barbs 19 which incline downwardly and overlap. Disposed upon the top of the packing member 18 is a gland member 20 which is abutted by a gland nut 21 having lugs 21*a*. The packing member 18 may be compressed by adjustment of nut 21. The barbs are such that pressure from within the casing tending to leak by the cable 22 will cause the barbs to hug the cable. Furthermore, the barbs are dragged into more intimate contact with the cable 22 as the latter passes outwardly. At this time, the pressure tending to leak through the stuffing box around the cable aids the packing fit, and the packing of the stuffing box is made more effective by reason of the outward dragging action of the cable. On in-

ward movement of the cable, pressure of the barbs is relieved.

Within the lateral walls of the cage are ball openings 23 choked to prevent the balls from rolling out and disposed in the openings are balls 24 of such diameter with respect to the thickness of the cage wall that the balls project both within the bore of the cage and externally thereof. Within the cage is a retainer having a cylindrical reduced portion 25 and an enlarged portion 26. Above the enlarged portion is a stem 27. The shoulder between the enlarged portion 26 and the reduced portion 25 is tapered to cooperate with the seat formed in the lower end of the bore of the cage. A compression spring 28 tends to force the retainer downwardly. A bore for accommodation of the cable extends lengthwise of the retainer.

With the retainer in position shown in Fig. 1, the balls 24 are forced outwardly and maintained in the keeper groove 7, locking the cage and associated parts to the sleeve 6. The retainer may be lifted against the action of spring 28 so that the reduced portion 25 is registered with balls 24, enabling the latter to be retracted sufficiently to clear the keeper and unlock the cap from the sleeve. On pulling the cap from the base sleeve, there are no parts which are liable to become detached and fall to the derrick floor. Heretofore, oil savers with releasable caps have employed locking triggers and fingers which become detached, fall and injure the workmen. The chokes 7*a* in the ball openings prevent this. To provide for convenience in assembly and disassembly, screws 29 are provided to hold balls 24 from accidentally falling into the bore of the cage.

In the position shown in Fig. 1, the parts of the oil saver are locked in position, and the cable 22 may be reciprocated. If the socket 22*a* is drawn upwardly to engage the retainer and lift the latter, the cage and its parts will be unlocked and may be lifted from the base.

What I claim is:—

1. In an oil saver for coaction with a cable having a swell thereon, the combination of a tubular member adapted to be secured to the upper end of a well casing and having an internal keeper, a cap having a cage depending therefrom, said cage being seated in the bore of said tubular member, balls supported in said cage for lateral protraction and to form a catch with said keeper, a slidable ball retainer in said cage having an enlarged portion to be registered with said balls and hold them in protracted position engaged with said keeper whereby to lock said cage to said member, said retainer having a reduced portion registerable with said balls to enable them to be retracted to release said cage and permit withdrawal of said cap, said retainer being normally maintained in locking position and having a bore through which said cable may slidably pass with a swell thereon engaging the retainer for moving the latter to release position.

2. In an oil saver for coaction with a cable having a swell thereon, the combination of a tubular member adapted to be secured to the upper end of a well casing and having an internal keeper, a cap having a cage depending therefrom, said cage being seated in the bore of said tubular member, balls supported in said cage for lateral protraction and to form a catch with said keeper, a slidable ball retainer in said cage having an enlarged portion to be registered with said balls and hold them in protracted position engaged with said keeper whereby to lock said cage to said member, said retainer having a reduced portion registerable with said balls to enable them to be retracted to release said cage and permit withdrawal of said cap, resilient means normally maintaining said retainer in locking position, said retainer having a bore through which said cable may slidably pass with a swell thereon engaging the retainer for moving the latter to release position, and a stuffing box in said cap for packing the cable.

3. In an oil saver for coaction with a cable having a swell thereon, the combination of a tubular member adapted to be secured to the upper end of a well casing and having an annular keeper groove, a cap having a tubular cage depending therefrom, said cage being seated in the bore of said tubular member, and having lateral openings, balls supported in the openings of said cage for lateral protraction and to form a catch with said keeper groove, a slidable ball retainer in said cage having an enlarged portion to be registered with said balls and hold them in protracted position engaged with said keeper groove whereby to lock said cage to said member, said retainer having a reduced portion registerable with said balls to enable them to be retracted to release said cage and permit withdrawal of said cap, said retainer being normally maintained in locking position and having a bore through which said cable may slidably pass with a swell thereon engaging the retainer for moving the latter to release position.

4. In an oil saver for coaction with a cable having a swell thereon, the combination of a tubular member adapted to be secured to the upper end of a well casing and having an annular keeper groove, a cap having a tubular cage depending therefrom, said cage being seated in the bore of said tubular member and having lateral openings, balls supported in the openings of said cage for lateral protraction and to form a catch with said keeper groove, a slidable ball retainer in said cage having an enlarged portion to be registered with said balls and hold them in protracted position engaged with said keeper groove

whereby to lock said cage to said member, said retainer having a reduced portion registerable with said balls to enable them to be retracted to release said cage and permit withdrawal of said cap, resilient means normally maintaining said retainer in locking position, said retainer having a bore through which said cable may slidably pass with a swell thereon engaging the retainer for moving the latter to release position, and a stuffing box in said cap for packing said cable.

5. In an oil saver for coaction with a cable having a swell thereon, the combination of a tubular member adapted to be secured to the upper end of a well casing and having an annular keeper groove, a cap having a tubular cage depending therefrom, said cage being seated in the bore of said tubular member and having lateral openings, balls supported in the openings of said cage for lateral protraction and to form a catch with said keeper groove, a slidable ball elongate retainer in said cage having an enlarged portion to be registered with said balls and hold them in protracted position engaged with said keeper groove whereby to lock said cage to said member, said retainer having a reduced portion registerable with said balls to enable them to be retracted to release said cage and permit withdrawal of said cap, a compression spring in said cap engaging said retainer to normally maintain it in locking position and having a bore through which said cable may slidably pass with the swell thereon engaging the retainer for moving the latter to release position, and a stuffing box in said cap for packing said cable.

In witness that I claim the foregoing I have hereunto subscribed my name this 27th day of February, 1931.

GORDON SAUNDERS.