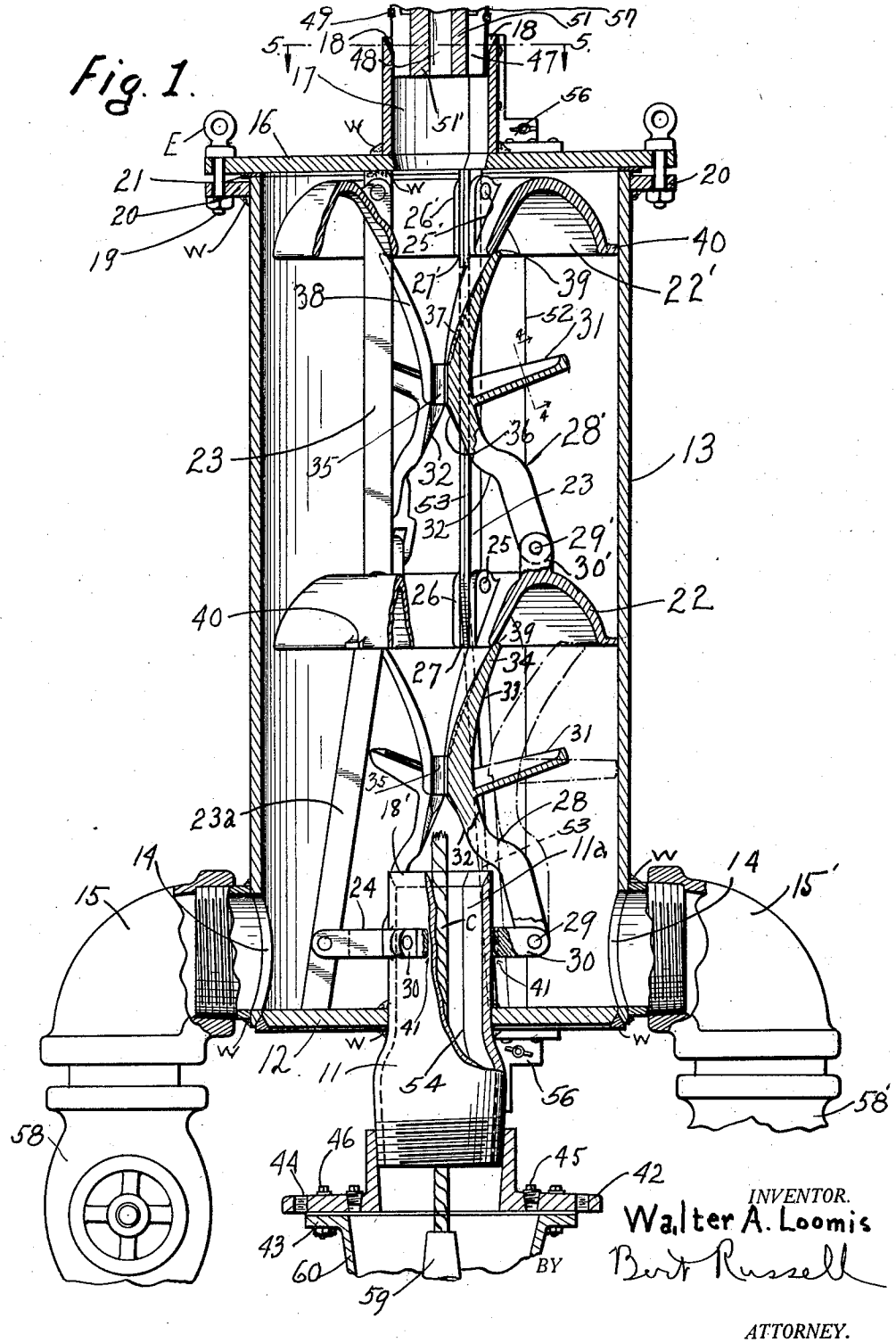
June 9, 1931. W. A. LOOMIS 1,809,175

SAFETY OIL SAVER

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Fig. 1.



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SAFETY OIL SAVER

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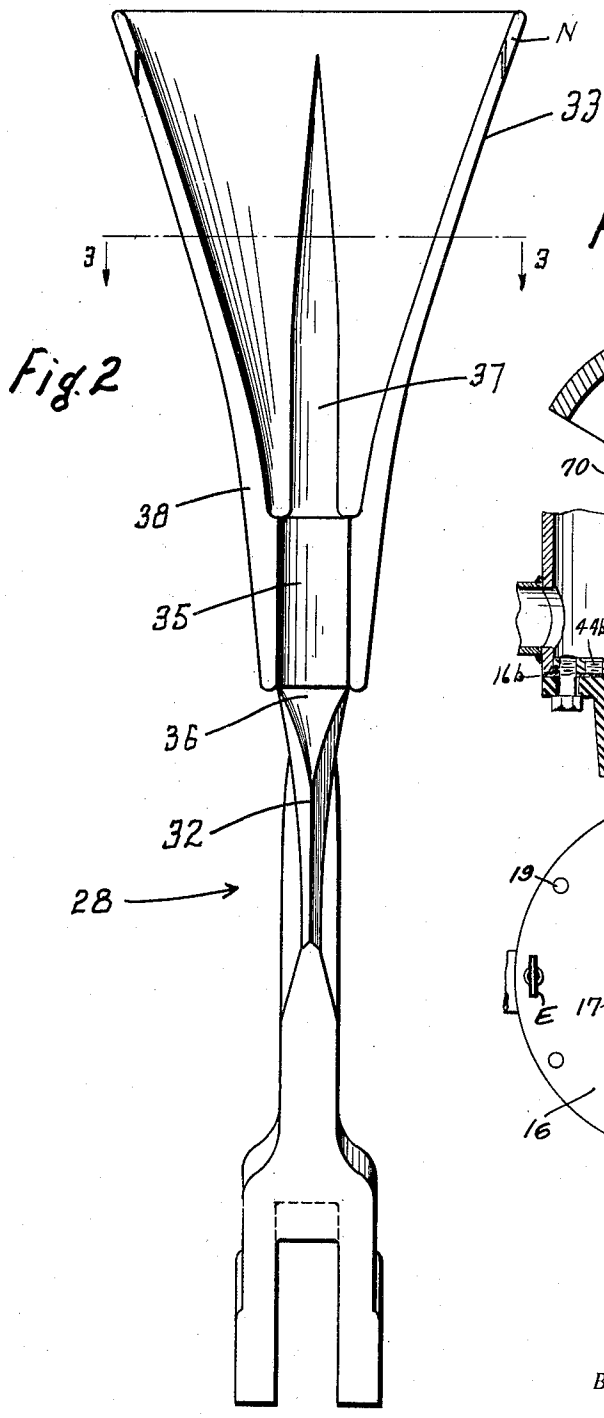


Fig. 2

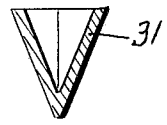
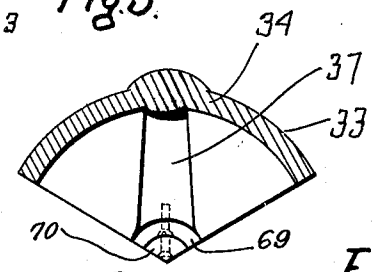


Fig. 4.

Fig. 3.



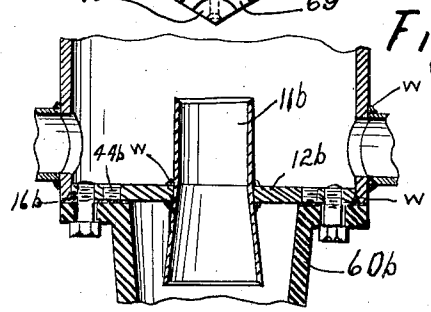


Fig. 6.

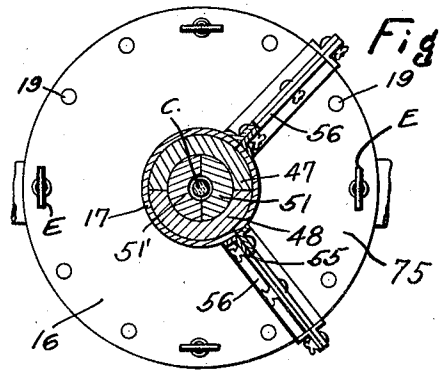


Fig. 5

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SAFETY OIL SAVER

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Fig. 7a.

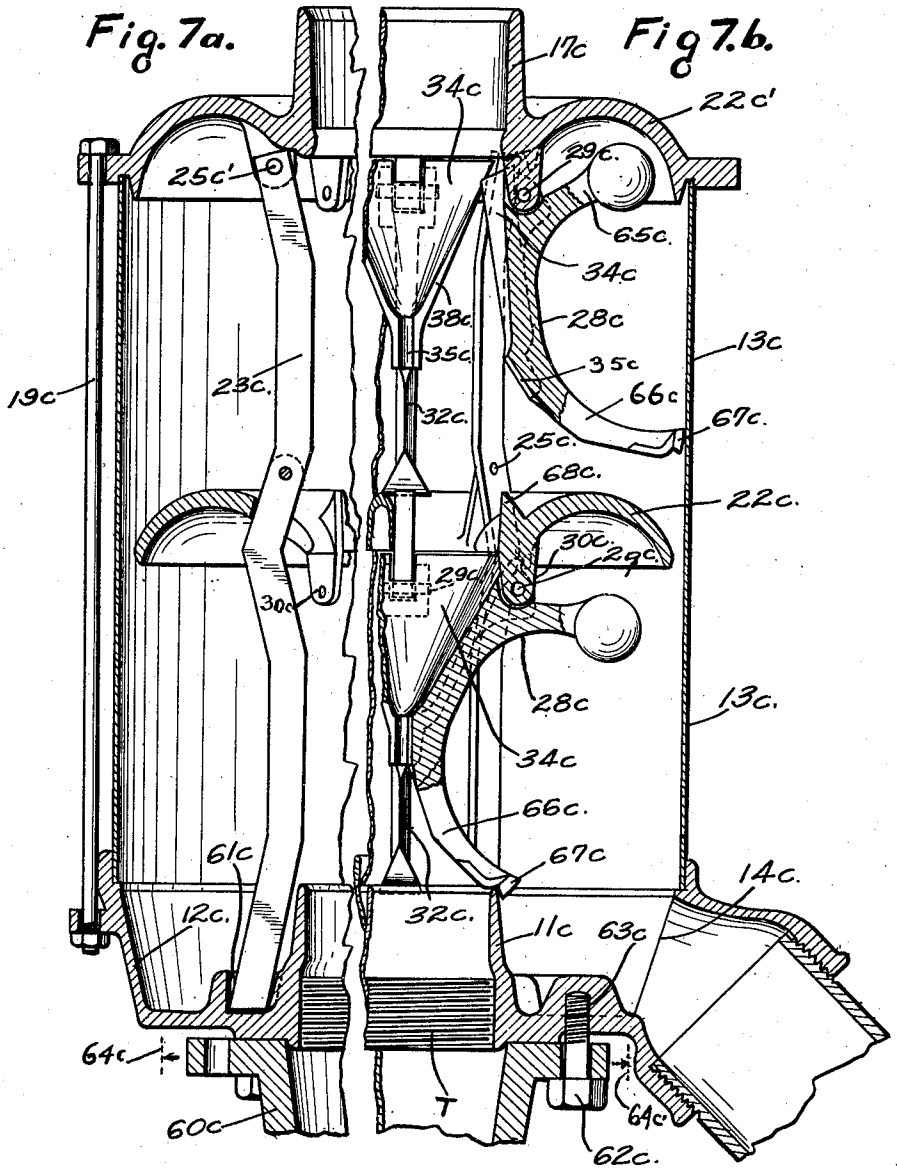


Fig. 7b.

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Patented June 9, 1931

1,809,175

UNITED STATES PATENT OFFICE

WALTER A. LOOMIS, OF WHITTIER, CALIFORNIA

SAFETY OIL SAVER

Application filed July 14, 1927. Serial No. 205,757.

As may be inferred from the above title, this invention relates to a unit, suitable for installation at the mouth of an oil well, designed primarily to obviate or minimize the escape and waste of oil, either during the elevation of a cable (or its equivalent) or subsequently to the withdrawal or ejection of a swab or drilling or other tools from a well.

As is well known to workers in this art, every upward withdrawal of a cable or a pipe string, involving what has commonly been referred to as a "wet job", has heretofore ordinarily resulted in a slopping of oil over equipment and workmen. Frequently a serious accident as well as wastage of oil is caused. When a high-pressure reservoir of oil or gas is encountered entire tool strings are occasionally ejected in a violent manner. The subsequent loss of oil, even when no fire occurs, may far exceed, in economic importance, the resultant damage to equipment. It is accordingly an object of my invention to provide for the installation of an oil saver at the top of an oil well so that, operations such as swabbing, fishing, drilling or the like may be conducted therethrough, while parts are normally in contact with a cable, drill string or the like, with parts so shaped and supported as to be predisposed toward an inner position, and with parts which are adapted to serve as vanes disposed to be forced inward by an escaping stream of oil or gas, to prevent a substantial escape of oil about a cable or pipe string or subsequently to the removal of such a cable or string, the structure also permitting a quick removal of tools without violent disturbance or ejection of oil.

Other objects of my invention, including the provision of a housing which is permanently secured to an attachment nipple and is provided with one or more outlets at a low level, and including also the provision of a removable inner organization comprising not only the mentioned vanes, or sets of vanes, but also a downwardly concaved annular deflector, or a plurality of such deflectors, may be best appreciated from the following description of an illustrative embodiment of my invention taken in connection with the appended claims and accompanying drawings, in which:—

Figure 1 is for the most part, a substantially central vertical section, with parts broken away to a lesser depth, and an optional flange element being shown.

Fig. 2 is an elevational detail view separately showing a single vane,—closely similar to those in Fig. 1.

Fig. 3 is a horizontal section, taken substantially as indicated by the line 3—3 of Fig. 2 with optional parts added.

Fig. 4 is a detail view, comparable with Fig. 3, as to scale, but taken substantially as indicated by the line 4—4 of Fig. 1.

Fig. 5 is a detail view, taken substantially as indicated by the line 5—5 of Fig. 1, and showing optional features.

Fig. 6 is a vertical section showing how need for a separate flange element of the type shown in Fig. 1 may be obviated by an alternative construction.

Figs. 7*a* and 7*b* are respectively partial vertical sections taken in different diametral planes, to show features of an additional alternative form in which vanes are dependently pivoted from deflectors,—a cast upper deflector being adapted to serve as a top closure element and a cast bottom closure element being adapted to serve several distinct purposes hereinafter mentioned, (and one vane of an upper set being shown as outwardly displaced).

Referring to the details of that specific embodiment of my invention chosen for purposes of illustration, 11 being a so-called swaged nipple, shown as externally threaded at its lower end, suitable for its attachment, by an ordinary or special coupling, to the upper end of pipe string, or to any control fitting employed at the top of a well. This nipple is shown as extending through and as adapted to support a bottom plate 12 of a cylindrical shell or housing 13. This shell or housing is provided with one or more outlet openings 14, 14′ for oil or the like, said openings being shown as provided with elbows 15, 15′ to which any suitably valved pipes may be connected; and beneath an op-

tional covering or closure element 16, I may provide oil stripping and/or deflecting means of any preferred type.

The removable closure element 16 is shown as centrally provided with a pipe nipple 17 (preferably having a beveled inner surface at 18, to facilitate the guidance of tools therethrough). It is here shown as secured to the shell 13 by means of bolts 19, extending through an outer edge thereof and through a corresponding flange 20 of the shell 13. A gasket 21 is preferably interposed between the element 16 and the flange 20. Within the housing 13, I show a plurality of downwardly concaved annular deflectors 22, 22′ supported by removable positioning means in the form of a frame comprising three substantially upright rods or legs 23. The lower and outwardly bent portions 23^a of these rods or legs are shown as secured to a spreader 24, surrounding the inner and smaller end 11^a of the attachment nipple 11. The upper ends of said rods are secured to the top closure element 16, to facilitate handling of the entire interior organization comprising said rods as a unit.

The lower deflector 22 is shown as rigidly secured to the rods 23 by bolts or rivets 25, extending through said rods and through suitably spaced lugs 26, positioned at the sides of slots 27; I may employ a similar construction, comprising bolts or rivets 25′, and lugs 26′ disposed at the sides of slots 27′, in securing the upper deflector 22′ in its illustrated position. For the aforementioned stripping effect and for the purpose of directing an upward stream of oil or the like, delivered through the attachment nipple 11, outward toward the mentioned deflectors (one or any desired number thereof being provided, according to conditions encountered or anticipated), I may employ any suitable number of sets of movable vanes 28, 28′ biased toward an inner position.

Both the lower set of vanes 28 and the upper set of vanes 28′ are shown as pivotally supported at the lower ends thereof and as inwardly overbalanced. The vanes of the lower set are pivotally connected by pins 29 to suitable intermediate arms 30, provided upon the spreader 24. The upper set of vanes 28′ are pivotally connected by pins 29′ with upwardly extending bearing bosses 30′, shown as cast integrally with the lower annular deflector 22.

Each of the vanes 28—28′ are shown as provided with a rearwardly extending stop arm 31, adapted to engage the housing 13, or its equivalent, to so limit the outward movement of said vanes that they shall always tend to fall inward, under the action of gravity and, into engagement with any cable, rod or the like (C) that may vertically extend through the aligned nipples 11 and 17. It will be understood that, when I employ three of the rods or legs 23, or equivalent elements adapted to position and support the aforementioned deflectors and/or vanes, I employ a corresponding number of said vanes, in each set, the said vanes being not only inwardly overbalanced, in the indicated manner, but provided with comparatively sharp and radially disposed edges 32, so positioned as to be encountered by and to divide any upward stream of oil. This acts to deliver the same toward rounded rear or outwardly disposed surfaces 33 of expanded portions 34, shown as adapted to contact with the respective deflectors 22, 22′ and to direct the stream of oil thereto. The impact of the oil against the surfaces 33 is effective to force and hold the vanes 28, 28′ in an innermost position, at which time the central cylindrical areas 35 thereof may snugly fit around and conform to a cable, or the like, for a stripping effect. It is evident that any fluid pressure helps to hold the vanes inward.

In the case of the illustrated vanes the lower portions thereof are shown so formed as to clear the top of an inwardly beveled upper edge 18′ of the reduced section 11^a of the attachment nipple 11. It will be understood that the length of curvature of each of the cylindrical areas 35 may amount to 120°, the spread at the top of portions 33 being only sufficiently less to enable the vanes to interfit between the legs 23. In order that the vanes 28, 28′ may serve as guides and nevertheless automatically yield outwardly to allow an ascending or a descending body to pass therebetween, I may provide thereon centering or tool-contacting areas such as are shown at 36 and 37,—respectively below and above the cable-contacting cylindrical area 35. Although substantially radial faces provided at 38 might satisfactorily limit the inward movement of the described vanes, I prefer to provide for a slight overlapping at 39; and the respective deflectors 22, 22′ may, in turn, be provided with centering lugs 40, unless 22′ is shaped to fit 13.

Parts which are to remain permanently connected may be welded together, if desired as indicated at W. The spreader 24, or its equivalent, may include a connecting band which is provided with a conical surface at 41, to facilitate the positioning of the same on the nipple 11, after the latter, with the casing or housing 13, is placed in its position of use.

It will be understood that operations such as the deepening or the swabbing of an oil well, or the like, may be carried on directly through the described unit; and that oil obtained in swabbing may be carried away, with very little loss through the outlet or outlets 14, 14′. If desired one or more sets of vanes 28, 28′, with or without a corre-

sponding number of deflectors 22, 22′ may be used to strip oil from any cable or string or rod or pipe extending through the nipples 11 and 17.

In passing upward from the nipple 11 (either beside a cable or pipe string or tools or after the latter are removed) any forcibly ejected fluid would be largely caught and downwardly delivered even if the described vanes were omitted. I nevertheless find that the conjoint use of the described vanes and deflectors is highly advantageous as only a very small and easily controllable quantity of oil may escape by passing two sets of vanes and two deflectors constructed and arranged in the described manner. Even a violently flowing well may be controlled by my described means and methods, with a minimum loss and minimum risk of fire or accident. Upon the securing of a suitable cap or plug, not shown, upon or in the nipple 17, it will be obvious that flow may be entirely restricted to one or more of the outlets 14, 14′—controllable by any desired valves, or by a "Christmas tree" arrangement including flow nipples. The interior parts of the device, whether used conjointly or separately, may be formed of, or coated with, any suitable wear-resistant substance or substances, immaterial to my present invention,—a coating of stellite being suitable to extreme conditions and within a steel housing or receptacle 13 I may use bronze vanes.

It is desirable for the purpose of reducing weight that I design the stop arms 31 with a V-shaped cross-section so that the vanes 28, 28′ may yield easily whenever pressed outward by any tool, or the like, passing therebetween. It should be understood that the strength, form and positions of the rods 23 adapt these elements to serve not only to connect and support the parts but also to guide any tool, or the like, so as to obviate risk of damage to the described vanes or to any other interior parts.

To facilitate installation and removal of a unit of the described general character some or all of the bolts 19, or any other desired parts may be provided with suitable eyes E, to two or more of which a rope (not shown) may be secured for engagement by any hoisting hook, or the like; and it should also be understood that, to secure one of my units in its position of use, I may utilize any suitable externally threaded nipple and/or an integral or separate flange element 42 of any usual or preferred character.

Although my units are being constructed in various sizes, it is not necessary to provide a different-sized unit for use with each size of pipe or control organization above which the same may be set. To obviate this, I take advantage of the fact that one common type of control head is provided with a funnel-like top, terminating in a flange 43 and may give the flange 42 a considerable breadth while providing it with several sets of oversize bolt holes 44 for alternative use with varying sizes of flanges 43. These holes are threaded so that any unused sets thereof may be closed by means of suitably threaded plugs 45,—and the opened set of said holes being used for connecting the oppositely disposed flanges 42 and 43, whatever may be the size of the latter, by means of bolts 46.

In view of the fact that a crown block (not shown) or other element over which the cable C, or its equivalent, may run is not certain to be in exact vertical alignment with the nipples 11 and 17, I may employ any desired guide means for said cable,—to avoid lateral displacement of vanes 28′. I may use, for example, a split plug comprising sections 47 and providing a suitable central passage 48. This plug may be formed of wood and may be finally put in position by hand so that it may be knocked out when hit by ascending tools; but it is within the scope of my invention to provide this guide element with unifying means such as clips 49 (Fig. 1) and/or a funnel-like upward extension of any desired character. The latter structure, if used at all, will be mainly in connection with any embodiments of my invention in which provision is made for "breaking out" a string of pipe containing oil.

Inner guide sections 51, 51′, if used, are preferably made separately removable. As shown in Fig. 5 of the drawings an entire unit is provided with a removable section 75 secured together by mating flanges 55, 56. This construction will enable my oil saver not only to be applied laterally about a drill cable, when a "gusher" is about to be brought in, but to be similarly employed, when desired, about a string of tubing full of oil, in order that as the latter is "broken" into sections or "stands" (wrenches being applied above the top of any funnel-like extension then provided at 57, and the inner guide sections 51, 51′ being omitted) that oil which would otherwise spill over the deck and be wasted may be carried off through outlets 14, 14′.

Nothing said above should obscure the fact that the illustrated designs of my safety oil saver are intended primarily for use in connection with so-called "cable" tools and bailers. The descent of a bailer to the bottom of a well in which gas may have accumulated below a body of rather heavy oil often upsets an unstable equilibrium; but no damage can result from a consequent sudden gush of oil and/or gas in case the bailing is regularly done through one of my described units. The interior organization of the oil saver being effective to prevent substantially waste of oil or gas either about the cable or

after the bailer is removed. By conducting drilling operations, or critical portions thereof, through one of my oil savers I am enabled to assure a quiet controlled removal of drill tools under adverse conditions such as have heretofore often resulted in disastrous and a violent ejection of the tools, followed or accompanied by an uncontrolled overflow of oil.

Unless for exceptional uses, I do not consider it important to provide for actual contact between the rounded top of the upper annular deflector 22′ and the inner surface of the top closure 16, nor necessary to provide the vanes 28, 28′ with notches N (see Fig. 2) at the upper corners thereof, to provide a fluid-tight fit in the regions of their contact with rods 23. It is an important advantage of my invention that, by proceeding in the general manner above described, a valve or valves 58, 58′ being so adjusted as to maintain a desired and a considerable pressure until tools or a bailer 59 (rising at about the same rate as the oil) come to the top of the well, preferably then opening the valve or valves 58, 58′ somewhat wider, I provide for the withdrawal or ejection thereof at a controlled rate and for an immediate and automatic inward movement of the vanes 28, 28′ behind the same. Further flow may then be controlled by the valve or valves 58, 58′, or by any suitable main valve (not shown) provided in that control organization which I diagrammatically represent by a conical body 60, integral with the mentioned flange 43. It will be obvious that, the withdrawal of the cable C, or its equivalent, having thus rendered it possible completely to close the mentioned main valve, instead of directing subsequent flow through the described unit I may remove the same for use elsewhere and substitute an ordinary or special flow nipple, or the like,—not shown and immaterial to my present invention.

In Fig. 6 I suggest the use of a bottom plate 12*b* (through which extends a swaged nipple 11) serving directly as a flange element; and, to adapt it to use with so-called "T. B. heads" 60*b* of various sizes, I may provide it with a plurality of sets of bolt or screw-receiving holes 44*b*. A gasket 16*b* is interposed between the flange of head 60*b* and the plate 12*b* so that no plugs are then necessary.

In Figs. 7*a* and 7*b* I show an alternative form of construction in which a lower set of vanes 28*c* and an upper set of vanes 28*c*′, identical in general form, are pivoted respectively to deflectors 22*c* and 22*c*′,—the latter serving not only as a top closure element but as an upper nipple 17*c*.

Between the upper deflector 22*c*′ and a special bottom casting 12*c*, with which a lower nipple 11*c* may be integral, I show a shell 13*c* as retained by comparatively long bolts 19*c*. An interior frame or guide element 23*c* may be secured by bolts or rivets 25*c*′ so as to be removable with the mentioned upper deflector or top closure element 22*c*′.

In this form of my invention I propose to use four, rather than three, of the guide or frame elements 23*c*. It will accordingly be understood that Fig. 7*a*, in which no vanes 28*c* are shown, is taken in a plane at an angle of about 45° with the plane in which Fig. 7*b* is taken.

To guide and steady the frame elements 23*c*, during and after assembly, the mentioned bottom casting 12*c* may be provided with a corresponding number of wells 61*c*, adapted to receive the same; and, as in that embodiment of my invention illustrated in Fig. 6, the bottom casting 12*c* may be adapted to serve also as a flange for the attachment of this oil-saver to, a so-called "T. B. head" 60*c*, as by means of screws 62*c*. An identical or a different set of threaded sockets 63*c* (shown as so formed as to obviate all risk of leakage therethrough) may be used to secure this oil-saver to "T. B." or other heads of various sizes, as, for example, to a head corresponding in diameter to the distance between dotted lines 64*c*, 64*c*′. The casting 12*c*, shown as providing an upwardly disposed annular concavity for the reception of oil, or the like, may be provided also with any desired number of outlet openings 14*c* and with an interior thread T by which it may be attached directly to a casing or the like. I especially emphasize in connection with this embodiment of my invention, the use of dependent or inwardly biased vanes,—each being shown as provided with a weight-carrying arm 65*c*, movable to and from a concavity beneath one of the mentioned deflectors and tending to hold said vanes in yieldable mutual engagement, or in engagement with any cable, or the like, centrally disposed therebetween.

Assuming that four of the frame or guide elements 23*c* are provided, it will be understood that the spread of the respective expanded portions 34*c*, and the curvature of the respective cylindrical portions 35*c* may, in each case, amount to 90°; and that the respective faces 38*c* may rest in radial planes when in mutual contact. Due to the fact that the respective vanes are comparatively light and freely movable upon pivot pins 29*c*, carried by dependent lugs 30*c*, the range of movement thereof may be limited in any suitable way,—as by providing downward extensions 66*c* with specially-shaped ends 67*c*, adapted alternatively to engage the shell 13*c* (when forced outward during the introduction or withdrawal of tools or the like) or to engage the nipple 11*c* (in the case of the lower set of vanes) or suitable stop

elements 68*c*, shown as carried by the deflector 22*c*,—the latter being supported by pins or rivets 25*c* from the guide frame elements 23*c*.

Most of the parts of this oil-saver may be inexpensively cast; I prefer to form the vanes 28*c*, 28*c*′ from an aluminum or other light alloy so that they may be laterally displaced with ease. If desired each vane may be provided with an edge 32*c*.

In conclusion, it will be obvious that the diameter of the opening provided by any of the described sets of vanes may be varied ½″ or a ⅝″ or a 1⅛″ cable, or the like may normally pass between them; and, if desired, I may obviate the substitution of new sets of vanes, whenever a change is made in a cable, by providing removable bushings as shown at 69, Fig. 3; I may use in a similar manner (and presumably in only the upper most set of vanes) complemental and removable filling pieces 70, so formed as to entirely eliminate any opening between a set of vanes. This will automatically form a liquid-tight closure when a cable, or tool, bailer or the like carried thereby has been completely removed.

Although I have herein described a single complete embodiment of my invention, it should be understood not only that the cylindrical curvatures of the vanes 28 at 35 may be adapted to a cable or other linear element of any desired diameter and that various features of said invention might be independently used but also that numerous modifications thereof might easily be devised by workers in the art to which this case relates, without involving the slightest departure from the spirit and scope of this invention as the same is indicated above and in the following claims; and I take it for granted that a "versatile" flanged union element such as those which I have shown at 42, 12*b*, and 12*c*, as provided with more than one row of bolt holes and with means whereby all but one set of said holes may be closed, according to the diameter of a cooperating flange, is capable of a great variety of alternative uses in connecting like or unlike tubular elements.

In operation of the present invention, the structure is assembled as shown in the drawings, and may be installed upon the upper end of a casing either by securing the swaged nipple 11 in place or by removing the section 75 as shown in Fig. 5, so that the structure could be positioned around a cable, string of tools, or the like. It may be even assumed that the structure is mounted over a well casing before the string of tools is lowered into the well, in which event the vanes 28 will be held in their closed position with relation to each other, and with the inner flanges of the central openings through the deflectors 22 and 22′. It will be understood that the upper portions 33 of the vanes combined in their normal closed positions to form segments of an inverted cone-shaped shell, the base portion of which overlaps the wall of the central opening through the concave deflectors 22 and 22′, and will, in this position act to divert oil upwardly and outwardly into the annular concentric groove or concavity formed around the lower face of the deflectors 22 and 22′. Thus, it will be evident that when there is no tool or cable disposed between the segments of the deflecting cone, the greater portion of the upwardly moving fluids will be diverted from their substantially vertical lineal path of travel through the housing 13, and will be directed into the annular groove of the concave deflectors. It will also be apparent that the oil pressure will act upon the outer face of the deflecting cone, comprising the three segments 33, to hold these segments in their closely related assembled condition, and that the oil will thereafter be diverted downwardly within the cylinder 13, to be drawn off through the outlets 14 and 14′.

In the event that a cylindrical area 35 has been provided in the vanes, it will be evident that a relatively small opening will occur between the vanes when moved to their innermost position, and that this opening between the lowermost set of vanes will permit a direct lineal travel of oil upwardly through the central opening of the concave deflector 22 and toward the outlet of the oil saver.

The stream of fluid in its upward travel will, however, tend to expand and will strike the lateral edges 32 of the upper set of vanes 28′, thereafter being diverted to the outer conical face of the deflecting surfaces 33 to travel therealong into the deflecting groove of the upper concave deflector 22′. It will thus be apparent that even though there is no tool, cable or other like device, extending downwardly through the oil saver, the design and correlation of the concave deflectors and the segmental cone deflectors formed by the vanes will act to dissipate the force of the upwardly moving stream of oil and change its direction of travel so that the major portion of the stream will be arrested in its flow and diverted through the outlets 14 and 14′.

In the event that the cable or string of tools is to be lowered into the well, this may be readily done, since the vanes will automatically accommodate a tool of any required shape or dimension. In the lowering operation, the tool will strike the tool contacting area 37 of the vanes and will cause the upper set of vanes 28′ to swing outwardly on the pivots 29′ and in opposition to the force of gravity, holding the vanes in their inward position due to their over-balanced pivotal mounting and by additional

force of any fluids acting against the deflecting surfaces 33. The members 23 will guide the tool downwardly, and as the vanes swing to the limit of their outward movement, as determined by the stops 31, the tool will pass on downwardly swinging the vanes 28 outwardly. After any enlarged portions of the drill string or tool have passed the vanes, it is evident that the vanes will close-in around the cable or other portions of reduced diameter, and will provide an effective barrier against the great portion of escaping fluid. When the drill string or other piece of equipment is to be removed, a reverse operation takes place. The vanes will swing outwardly to accommodate the diameters of the parts passing therebetween, and will automatically close in to contract the opening through which the tool passed and to more effectively divert fluids outwardly from the direction of travel of the vertical stream, to entrap the fluid and permit it to be carried away under control.

It will thus be seen that the structure here disclosed provides means for entrapping a stream of oil passing therethrough, to divert it from its longitudinal path of travel and to permit it to be drawn off under substantial control, and it will further be evident that means are here provided to automatically act to permit the passage of cables, drill strings, or other tools, through the chamber in which the oil is trapped without permitting the escape of any material amount of the fluids, and while insuring that oil will be stripped from the cables and tools as they are withdrawn from the well.

While I have shown the preferred form of my invention as now known to me, it will be understood that various changes may be made in the combination, construction and arrangement of parts of those skilled in the art, without departing from the spirit of the invention as claimed.

I claim as my invention:

1. In an oil saver: a substantially tight housing provided with an oil outlet opening and with additional openings through which a cable may pass; outwardly yieldable means, within said housing, for stripping oil from said cable; and a plurality of downwardly concave annular deflectors spaced apart in said housing and each provided with a central opening.

2. In an oil saver: a substantially tight housing provided with an oil outlet opening and with additional openings through which a cable may pass; outwardly yieldable means, within said housing, for stripping oil from said cable; and a plurality of downwardly concave annular deflectors spaced apart in said housing and each provided with a central opening,—said deflectors being supported by removable frame elements which extend therethrough.

3. In an oil saver: a receptacle provided with means for attachment above a control organization and with an oil outlet; and means above the bottom of said receptacle for stripping oil, for exit through said outlet, from a linear element passing through said receptacle,—said stripping means being inwardly biased, said stripping means being supported in said biased position by means of pivotal supports near their lower ends.

4. In an oil saving organization: a receptacle provided with a bottom opening and a top opening, through which a cable may pass, and with an outlet; and means to check the escape of hydrocarbons through said top opening,—said means comprising pivotal vanes interposed between deflectors which are supported by guide elements.

5. In an oil saving organization: a receptacle provided with a bottom opening and a top opening, through which a cable may pass, and with an outlet; and means to check the escape of hydrocarbons through said top openings,—said means comprising pivotal vanes interposed between deflectors which are supported by guide elements constituting an interior frame.

6. An oil saver comprising: an enclosing wall including annular top and bottom members; and a set of vanes oscillatable within said enclosing wall upon pivots in their lower ends and so disposed as to be overbalanced to swing by gravity toward a common vertical center.

7. An oil saver adapted to be positioned over the open end of the casing of an oil well and through which a stream of oil may flow upwardly from the mouth of said casing, comprising a housing and a deflector member enclosed within said housing and disposed across the path of travel of the oil, said member having a central opening sufficient to accommodate a linear well working member, said deflector having a concaved under-face against which the diverted portion of oil will strike and be directed in a downward flow, and an inverted cone-shaped member disposed beneath the opening in said deflector to direct the stream of oil against the concave face of the deflector.

8. An oil saver adapted to be disposed over the mouth of an oil well casing and upwardly through which oil may be projected, comprising a housing having an opening in its lower end in communication with said casing and an opening in its upper end and a plurality of deflector plates disposed in parallel spaced relation to each other within the housing and positioned in the path of travel of the upwardly moving oil, said deflector plates having central openings in longitudinal alignment with the upper and lower openings of the housing, and

being formed with an annular concaved face concentric with the central opening therethrough to divert the oil from its lineal path of travel, and segmental inverted cone-shaped vanes disposed beneath the deflector plates and being yieldably held in their assembled conditions to temporarily obstruct the flow of oil in its lineal travel and to divert it into the annular concavities of the deflector plates while permitting said deflector segments to move outwardly and allow a lineally extending member to pass therebetween.

9. An oil saver adapted to be disposed over the mouth of an oil well casing and upwardly through which oil may be projected, comprising a housing having an opening in its lower end in communication with said casing and an opening in its upper end and a plurality of deflector plates disposed in parallel spaced relation to each other within the housing and positioned in the path of travel of the upwardly moving oil, said deflector plates having central openings in longitudinal alignment with the upper and lower openings of the housing, and being formed with an annular concaved face concentric with the central opening therethrough to divert the oil from its lineal path of travel, segmental inverted cone-shaped deflectors disposed beneath the deflector plates and being yieldably held in their assembled conditions to temporarily obstruct the flow of oil in its lineal travel and to divert it into the annular concavities of the deflector plates while permitting said deflector segments to move outwardly and allow a lineally extending member to pass therebetween, and means whereby said segmental deflectors will tend to move to their innermost positions by gravity.

10. An oil saver adapted to be disposed over the mouth of an oil well casing and upwardly through which oil may be projected, comprising a housing having an opening in its lower end in communication with said casing and an opening in its upper end and a plurality of deflector plates disposed in parallel spaced relation to each other within the housing and positioned in the path of travel of the upwardly moving oil, said deflector plates having central openings in longitudinal alignment with the upper and lower openings of the housing, and being formed with an annular concaved face concentric with the central opening therethrough to divert the oil from its lineal path of travel, segmental inverted cone-shaped deflectors disposed beneath the deflector plates and being yieldably held in their assembled conditions to temporarily obstruct the flow of oil in its lineal travel and to divert it into the annular concavities of the deflector plates while permitting said deflector segments to move outwardly and allow a lineally extending member to pass therebetween, means whereby said segmental deflectors will tend to move to their innermost positions by gravity, and means for diverting the upwardly flowing stream of fluids from its lineal path of travel to the outer faces of the segmental deflectors to tend to hold said deflectors in their innermost positions.

11. An oil saver comprising a cylindrical receptacle adapted to be centrally aligned with the mouth of a well, apertured closures at each end of said receptacle, drains in the lower portion of said receptacle, a vertically extending frame within said receptacle, segmental vanes, pivoted to said frame and a transversely extending deflector supported by said frame.

12. In a fluid saver comprising a receiving receptacle, having a plurality of suitably disposed outlets, a fluid reversal organization comprising a plurality of segments in pivotal relation with one another, a concaved deflector transversely of said receptacle, the inner wall of which forms a practical stream line with the exterior walls of segments.

13. In a fluid saver comprising a receiving receptacle having a plurality of suitably disposed outlets, a fluid reversal organization comprising inverted segmental cones in the medial horizontal line of said receptacle, said segments being pivoted near their lower extremity and rearwardly of their normal biased position, and a plurality of transversely extending concave deflectors so positioned that the exterior of the inverted cones forms a stream line with the interior wall of the deflectors, to the end that the fluid reversal organization forms practically an unbroken contour extending from an upwardly inclined direction to a reversely inclined direction.

In witness whereof, I have hereunto affixed my signature.

WALTER A. LOOMIS.