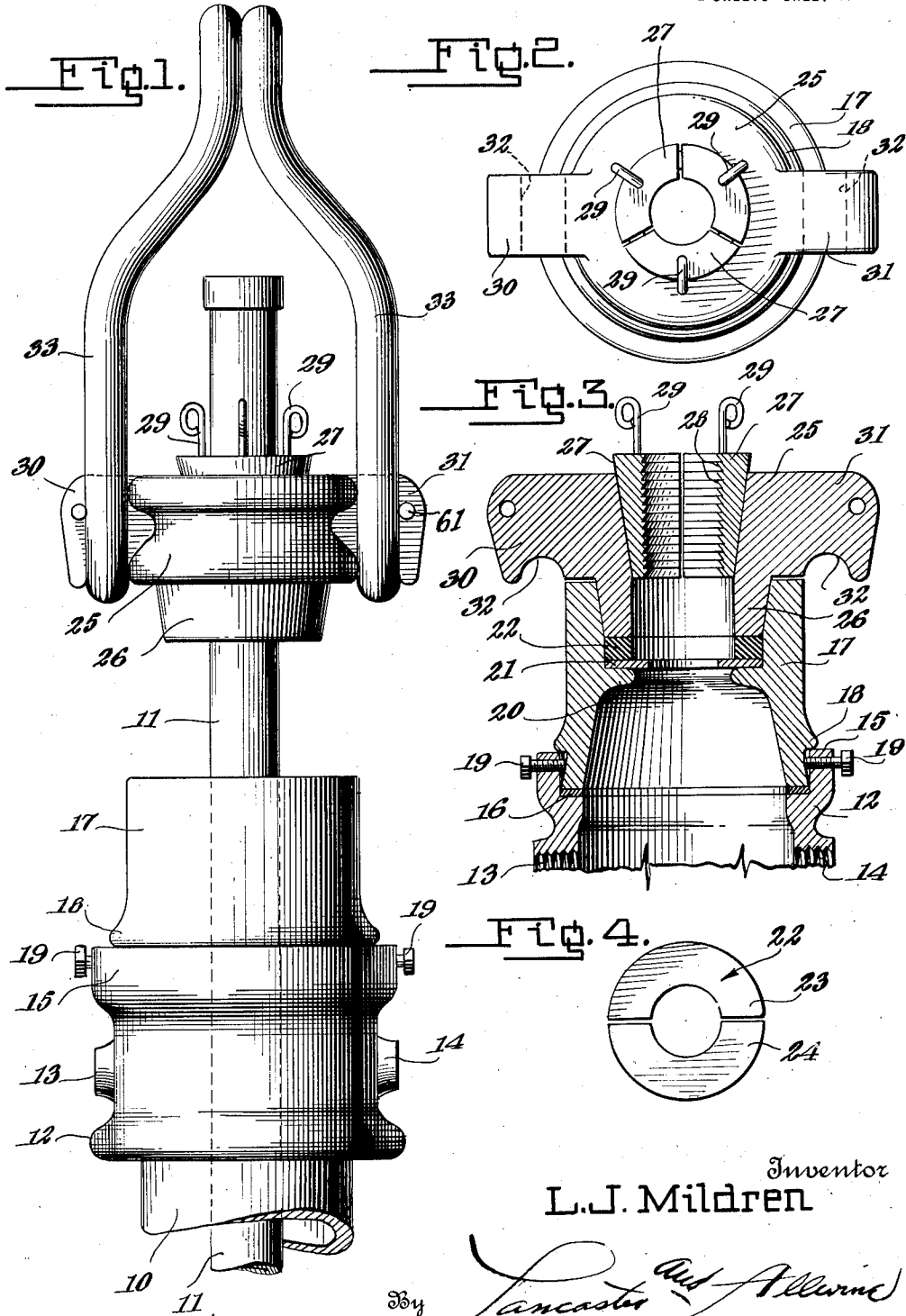


1,344,922.

Patented June 29, 1920.
2 SHEETS—SHEET 1.



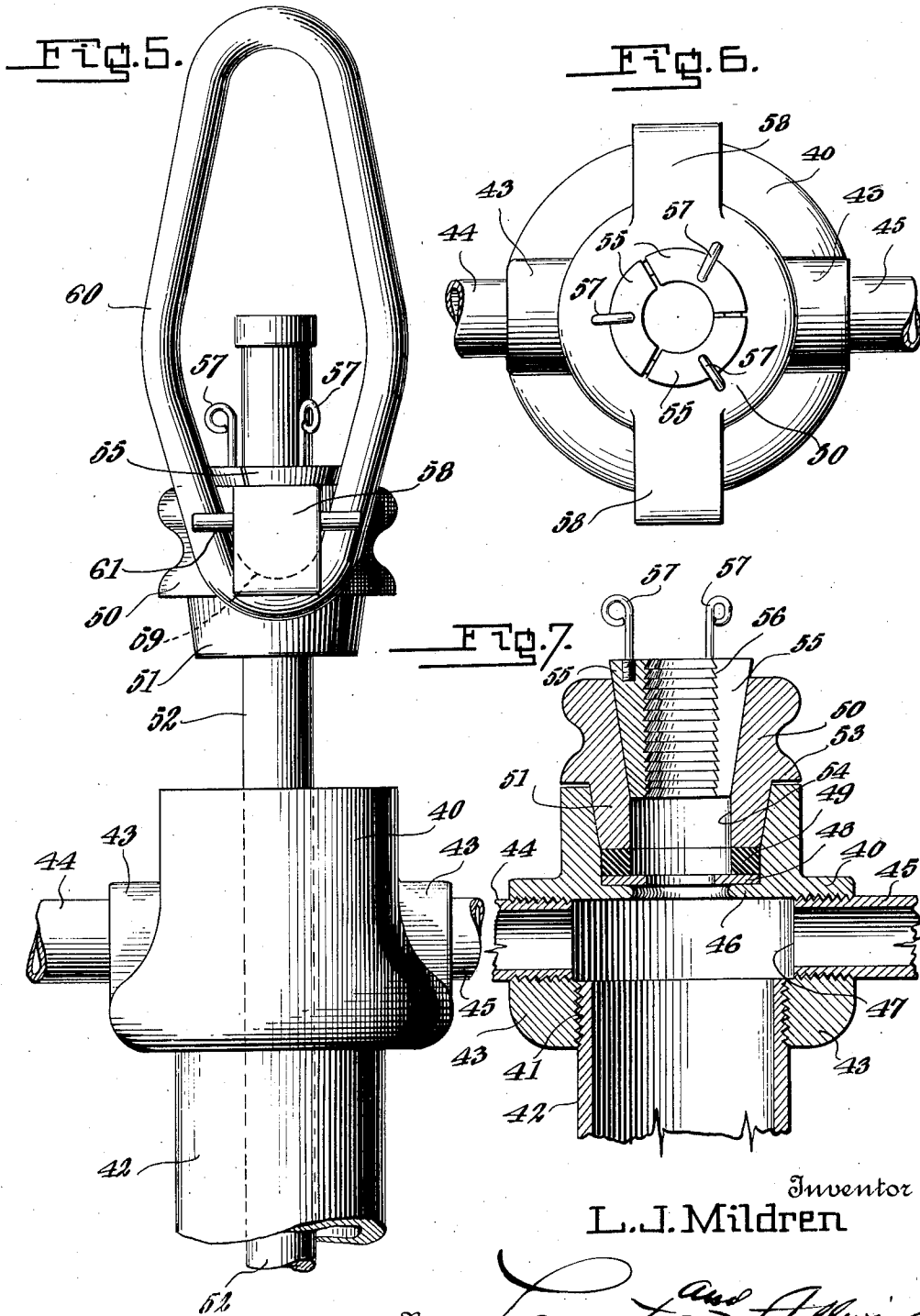
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UNITED STATES PATENT OFFICE.

LORY J. MILDREN, OF PONCA CITY, OKLAHOMA, ASSIGNOR OF ONE-HALF TO JEROME R. HINKLE, OF PONCA CITY, OKLAHOMA.

OIL-WELL APPLIANCE.

1,344,922.

Specification of Letters Patent. Patented June 29, 1920.

Application filed June 24, 1919. Serial No. 306,450.

To all whom it may concern:

Be it known that I, LORY J. MILDREN, a citizen of the United States, residing at Ponca City, in the county of Kay and State of Oklahoma, have invented certain new and useful Improvements in Oil-Well Appliances, of which the following is a specification.

This invention relates to a device or appliance to be used in suspending tubing in an oil or deep well and an object of the invention is to provide a device which will support the weight of the suspended tubing, when it is filled with fluid, and support long and heavy strings of tubing from the casing head or top of the well without liability of breaking.

The present mode of hanging or suspending a string of tubing in a well is to insert the top or last joint of the pipe through a metal ring which is made to fit the outside of the pipe snugly, but when the coupling or collar of this joint of pipe comes in contact with the metal ring it will rest upon the metal ring as the diameter of the coupling is larger than the ring and cannot therefore pass through the ring. This metal ring then is seated on the casing head top. The casing head top having an aperture sufficiently large to allow the tubing or coupling to pass through it, but when the metal ring which is larger than the aperture of the casing head top comes in contact therewith the tubing is then suspended from the casing head.

In this manner of suspending the tubing it is readily seen that the entire weight of tubing which is filled with fluid when the well is pumping thereby adding a greater weight to the tubing all depends upon the thread on the top of the upper joint of the tubing which is screwed or inserted in the bottom of the coupling. This method of suspending tubing in deep holes or wells is very unsafe and frequently the tubing breaks off in or at the thread where the same is inserted into the bottom of the coupling, causing the tubing to drop into the bottom of the well, thereby damaging the tubing and causing excessive expense and delay in

cleaning the well of the damaged pipe, as well as the loss of production while this work is in progress.

When the tubing reaches the bottom of the well, then the tubing is raised from the bottom to a certain desired point, where it is to be suspended. It is not often that the coupling of the uppermost joint of the tubing happens to come at the right place, so that the tubing can be suspended upon it. It is well known that the thread on tubing which is made at the factory is much truer and safer than threads which can be cut at a well with ordinary stock and dies; therefore, when the coupling has to be removed and a new thread cut at the well, it is seen that this thread cannot be as safe and strong as the machine made thread. This further adds to the liability of the thread breaking off and allowing the tubing to fall into the well.

The object of this invention is to provide a device which will overcome all of the above enumerated inconveniences, and which will prevent the tubing from breaking off at the thread or coupling of the uppermost section; also to provide a coupling head or tube suspending structure wherein a fluid tight joint is formed about the tubing, the said joint being formed by packing placed between two sections of the appliance and arranged whereby the weight of the tubing will cause a fluid tight joint and prevent the leakage of oil or liquid about the tubing.

A further object of the invention is to provide in a device as specified, a plurality of pipe gripping members, which are substantially wedge-shaped and have teeth upon their inner surfaces which will bite into the pipe and prevent slipping action of the pipe gripping members upon the tube, and further to provide a device to which links may be attached to facilitate the drawing of the tubing from the well.

Other objects of the invention will appear in the following detailed description taken in connection with the accompanying drawings, forming a part of this specification and in which drawings:

Figure 1 is a side elevation of the im-

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proved appliance showing it applied to the upper end of the casing.

Fig. 2 is a top plan of the appliance.

Fig. 3 is a vertical section through the 5 appliance.

Fig. 4 is a top plan of the gasket employed in the appliance.

Fig. 5 is a side elevation of a modified form of the appliance.

Fig. 6 is a top plan view of the modified 10 form and

Fig. 7 is a vertical section through the modified form of the appliance.

Referring more particularly to the drawings, 10 indicates the casing of an ordinary oil gas or deep water well in which a string of tubing 11 is suspended. This tubing 11 is, ordinarily made up of a series of connected sections and the improved appliance 20 is designed principally for supporting this string of tubing to prevent breakage thereof.

The casing 10 has a casing head 12 mounted upon the upper end thereof which is provided with diametrically opposed outlet openings 13 and 14, out of which the oil or liquid flows when the well is pumping. The casing head 12 is provided with an outwardly offset upstanding flange 15 forming a seat upon which a gasket 16 is 30 mounted. The lower end of the lower section 17 of the tubing supporting appliance fits within the upstanding flange 15, and is provided with an annular bead 18 which engages a portion of the upper edge of the 35 flange. Set screws 19 extend through the flange 15 and engage against the lower section 14 for rigidly connecting it to the casing head 12. The lower section 17 of the tube supporting structure is provided with 40 an internal annular flange 20, intermediate its ends, upon the upper surface of which flange a washer 21 rests. The gasket 22 rests against the washer 21 and this gasket is preferably made of sections 23 and 24 45 each semi-circular in plan, and of rubber or other analogous material to form a fluid tight joint to prevent the leakage of the fluid upwardly through the tubing supporting structure or appliance. The upper section 50 25 of the tubing supporting appliance is provided with a depending sleeve-like portion 26 which gradually increases in diameter from its lower end and fits snugly within the bore of the upper end of the 55 lower section 17, resting upon the gasket 22. The upper member 25 is provided with a central bore, the sides of the upper portion of which gradually diverge toward the upper end of the section. A plurality of pipe 60 gripping members 27 are mounted within the portion of the bore in the member or section 25, each forming a segment of a circle, the inner diameters of which, when placed within the bore are substantially

equal to the diameter of the tubing 11. The 65 inner surfaces of these members 27 are serrated, forming biting teeth which incline upwardly and are adapted to bite into the pipe 11, for securely connecting the pipe thereto and for supporting the pipe from 70 the members 17 and 25. The particular arrangement of the teeth 28 formed in the members 27 will cause the teeth to firmly bite into the tubing under tendency of downward movement thereof under its own 75 weight, thereby preventing slipping of the tubing, as well as preventing the tubing from falling into the well, and further insuring the tubing against breaking at its threaded portions. Upstanding withdrawing 80 rods 29 are connected to the members 27 and they have their upper ends rolled as clearly shown in the drawings to facilitate manual operation thereof.

A pair of diametrically opposed lugs 30 85 and 31 are formed upon the member 25 and they are provided with substantially semi-circular recesses 32 in their under surfaces, which project beyond the outer surface of the lower section 17 of the tubing 90 support. These lugs 30 and 31, are adapted to facilitate the connection of links 33, to the tubing supporting structure which links have their upper ends converging and connected being adapted for connection with 95 any suitable type of hoisting means to draw the string of tubing 11 out of the well casing 10.

From the foregoing description taken in 100 connection with the drawings, it will be apparent that with the improved tubing supporting structure, it will be unnecessary to cut and rethread the tubing at any point to permit the attachment of a coupling and link thereto for engagement against the 105 casing edge to support the tubing, as the improved supporting device may be positioned at any desired place along the length of the tubing for properly supporting it upon the lower section 17 and consequently 110 the casing head 12, thereby eliminating to a material extent the liability of breaking of the tubing.

In Figs. 5, 6, and 7, a modified form of 115 the tubing supporting structure is illustrated, the said form comprising a casing head 40 which is threaded, as shown at 41 upon the well casing 42. This casing head 40 has lateral projections 43 formed thereon at diametrically opposed points to which 120 projections to the pipes 44 and 45 are connected to permit the fluid which flows upwardly from the casing 42 to pass laterally from the casing head through these pipes. The pipes 44 and 45 are preferably threaded 125 into the lateral diametrically opposed extensions 43. The portion of the casing head 40 which projects above the lateral projection

43 is provided with an axial bore, the walls or sides of the upper portion of which gradually diverge toward the upper end thereof. An annular inwardly extending flange 46 is formed within the casing head 40, directly above the communication between the interior of the casing head and the pipes 44 and 45 forming a constricted communication between the bores in the upper portion of the casing head and the relatively large bores 47 therein with which the pipes 44 and 45 communicate. A washer 48 rests upon the flange 46 and a gasket 49 of any suitable material is mounted upon the upper surface of the washer 48. The two upper sections 50 of the tubing support is provided with a depending tubular portion 51, which gradually decreases in diameter toward its lower end, for snugly fitting within the upper tapered portion of the bore of the upper portion of the casing head 40 as clearly shown in Fig. 7 of the drawings, where the device is employed for supporting a string of tubing as indicated at 52. An annular ring or flange 53 is formed upon the upper section 50 and its under surface is flat for engagement with the upper end of the casing head 40. This upper section 50 like the upper section 25 of the forms illustrated in Figs. 1 to 4 inclusive is provided with an axial bore 54 the upper portion of which gradually increases in diameter toward the upper end of the section. A plurality of pipe gripping members 55 are provided, which have upwardly inclining teeth 56 upon their inner surfaces for engagement with the tubing 52 to support the latter against slipping or sliding movement, withdrawing rods 57 are connected to the members 55 to facilitate their withdrawal from within the bore 54 of the members 50.

A pair of diametrically opposed laterally projecting lugs 58 are formed upon the member 50 and they are provided with recesses 59 in their under surfaces adapted to receive therein the lower portions of links 60 to connect the device 50 to a suitable hoisting means to draw a string of tubing from the well. These lugs 58 and the lugs 30 and 31 are provided with openings extending therethrough adapted to receive pins as indicated at 61 to prevent accidental disconnection of the links 33 or 60 with the respective lugs.

Changes in details may be made without departing from the spirit of this invention, but;

I claim:

1. In a device as set forth, the combination of a lower section, an upper section provided with a depending tubular portion adapted for insertion into the lower section, an annular flange formed upon the lower section, a gasket upon said annular flange

and engaging against the inner end of said tubular portion for forming a fluid-tight connection between the upper and lower sections, said upper section provided with an axial bore, a plurality of pipe gripping members inserted into the upper portion of said bore for supporting gripping engagement with a pipe, laterally extending lugs formed upon said upper section and adapted for engagement with hoisting links, and pins extending transversely through said lugs for preventing accidental disconnection of the links and lugs.

2. In a device as set forth, the combination of a lower section, an upper section, said lower section provided with an axial bore, having the upper portion thereof gradually increasing in diameter toward its upper end, a depending tubular portion formed upon the lower end of said upper section and shaped to snugly fit within a portion of the said bore which gradually increases in diameter, said upper section provided with an axial bore, the upper portion of which gradually increases in diameter toward the upper end of the upper section, a plurality of tube gripping members inserted in the portion of said bore which gradually increases in diameter, said tube gripping members having upwardly inclining teeth upon their inner surfaces for biting engagement with a tube, and an annular flange within said lower section, and a gasket resting upon said flange and engaging the lower end of said tubular portion to form a fluid tight joint between the upper and lower sections.

3. In a device as set forth, the combination of a lower section, an upper section, said lower section provided with an axial bore, having the upper portion thereof gradually increasing in diameter toward the upper end, a depending tubular portion formed upon the lower end of said upper section and shaped to snugly fit within a portion of the said bore which gradually increases in diameter, said upper section provided with an axial bore, the upper portion of which gradually increases in diameter toward the upper end of the upper section, a plurality of tube gripping members inserted in the portion of said bore which gradually increases in diameter, said tube gripping members having upwardly inclining teeth upon their inner surfaces for biting engagement with a tube, an annular flange within said lower section, a gasket resting upon said flange and engaging the lower end of said tubular portion to form a fluid tight joint between the upper and lower sections, and withdrawing rods attached to said tube gripping members.

4. In a device as set forth, the combination of a lower section, an upper section,

said lower section provided with an axial bore, having the upper portion thereof gradually increasing in diameter toward its upper end, a depending tubular portion
5 formed upon the lower end of said upper section and shaped to snugly fit within a portion of the said bore which gradually increases in diameter, said upper section provided with an axial bore, the upper portion of which gradually increases in diameter toward the upper end of the upper section, a plurality of tube gripping members inserted in the portion of said bore which gradually increases in diameter, said tube
10 gripping members having upwardly inclining teeth upon their inner surfaces for biting engagement with a tube, an annular flange within said lower section, a gasket resting upon said flange and engaging the
15 lower end of said tubular portion to form a fluid tight joint between the upper and lower sections, withdrawing rods attached to said tube gripping members, laterally extending diametrically opposed lugs formed

upon said upper sections and provided with
25 recesses in their under surface and pins extending transversely through said lugs.

5. In a well appliance, tube supporting means arranged to engage the upper edge of the casing of the well, said supporting
30 means comprising upper and lower sections, tube gripping means removably carried by the upper section, laterally projecting lugs formed upon said upper section adapted to receive portions of hoisting links.
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6. In a well appliance, tube supporting means arranged to engage the upper edge of the casing of the well, the supporting means comprising upper and lower sections, tube gripping means removably carried by the
40 upper sections, laterally projecting lugs formed upon said upper section, and having recesses in their lower faces adapted to receive therein portions of hoisting links, and
45 a gasket between the upper and lower sections for forming a fluid tight joint therebetween.

LORY J. MILDREN