Nov. 24, 1925. 1,562,469

J. D. NIXON

TUBING SLIP AND SPIDER

Filed March 28, 1924 2 Sheets-Sheet 1

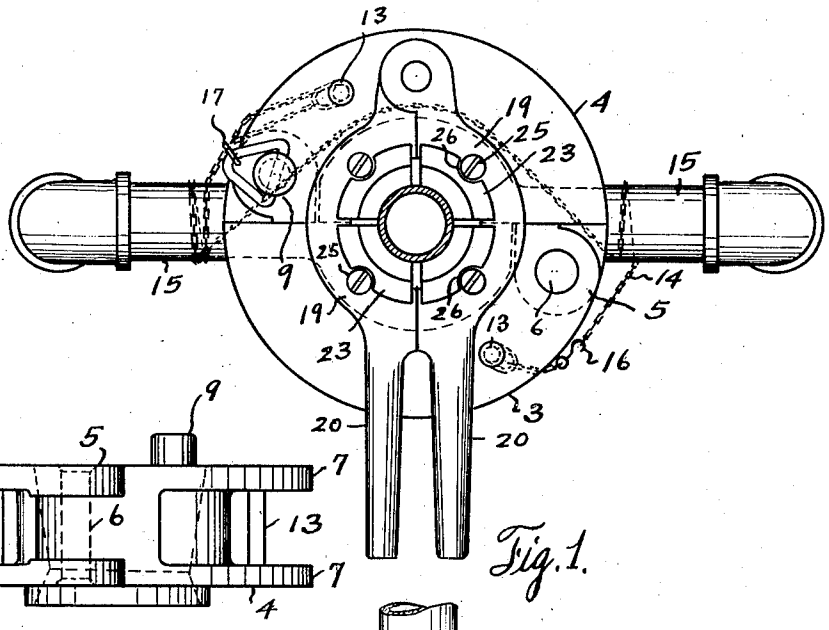


Fig. 1.

Fig. 3.

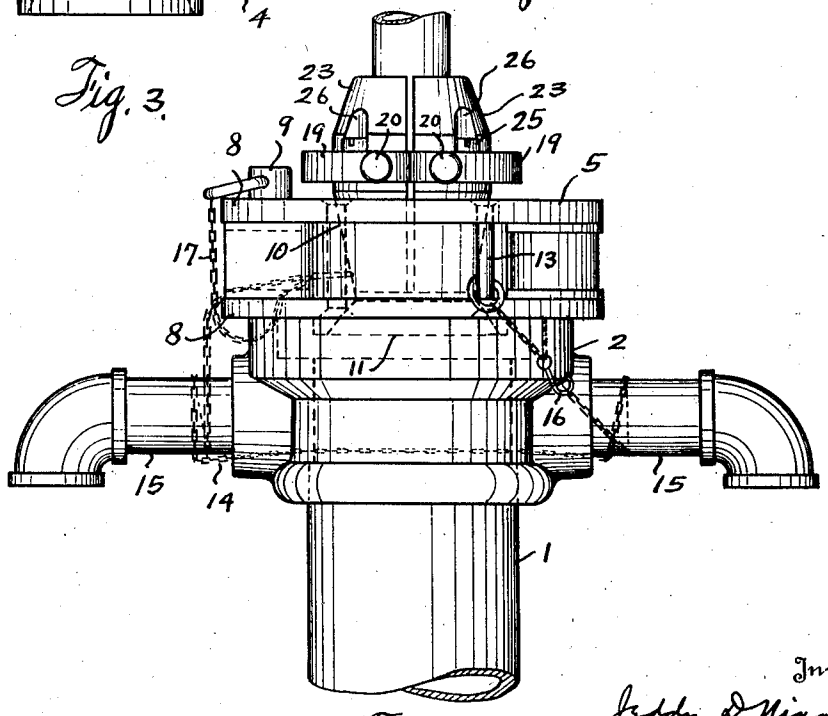


Fig. 2.

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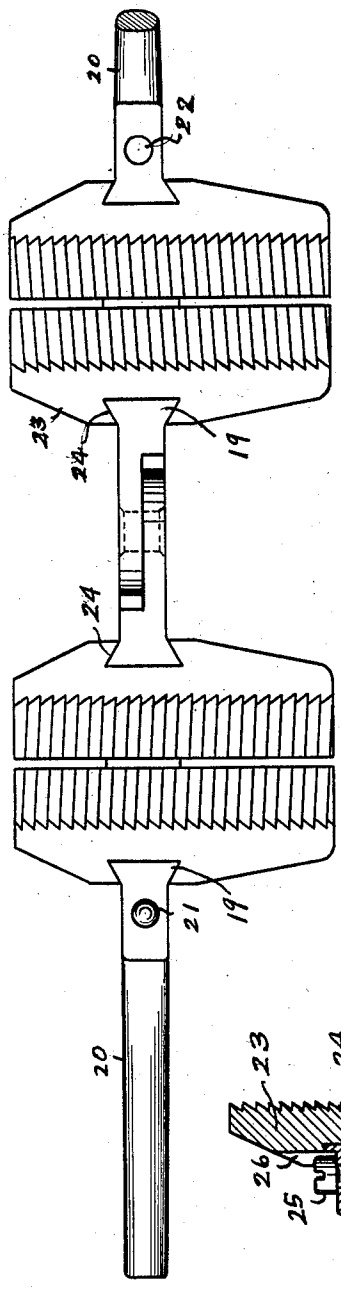


Fig. 5.

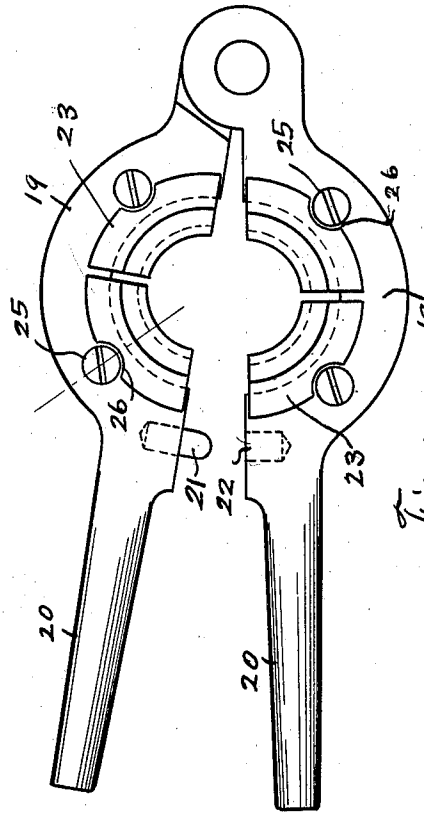


Fig. 4.

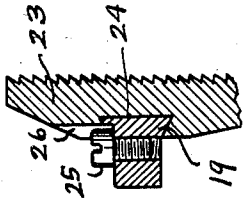


Fig. 6.

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Patented Nov. 24, 1925. 1,562,469

UNITED STATES PATENT OFFICE.

JEDDY D. NIXON, OF HOUSTON, TEXAS.

TUBING SLIP AND SPIDER.

Application filed March 28, 1924. Serial No. 702,652.

To all whom it may concern:

Be it known that I, JEDDY D. NIXON, a citizen of the United States, residing at Houston, in the county of Harris and State of Texas, have invented certain new and useful Improvements in a Tubing Slip and Spider, of which the following is a specification.

This invention relates to new and useful improvements in a tubing slip and spider.

One object of the invention is to provide a device of the character described specially designed for use in handling pump tubing, in letting the pump down into, and withdrawing the same from the well, and the device has been particularly designed for use in connection with casing heads of standard sizes, and is of such construction that the tubing of the pump will not be bent, dented, or otherwise injured in handling.

Another object of the invention is to provide a device of the character described which is of such construction that it may be easily and readily applied to the casing head, when it is desired to use the same, and as readily removed.

A further feature of the invention resides in the provision of improved type of tubing slips, forming part of the invention, which may be easily and safely handled, and which, when applied to the tubing, will engage with, and grip the same uniformly all the way around, and will not in any way bend, dent, or otherwise injure the tubing.

A still further feature of the invention resides in the provision of tubing slips which will not only hold the tubing suspended in the well, but will also engage with the tubing and prevent it from turning when screwing additional joints or sections, onto the upper end of the tubing, or unscrewing the upper sections therefrom, in making up, or breaking up the string of tubing.

With the above and other objects in view this invention has particular relation to certain novel features of construction, operation and arrangement of parts, an example of which is given in this specification and illustrated in the accompanying drawings, wherein:

Figure 1 shows a plan view of the device.

Figure 2 shows a side view.

Figure 3 shows a side view of the spider employed.

Figure 4 shows a plan view of the tubing slip.

Figure 5 shows an inside view thereof, with the slip open; and

Figure 6 shows a sectional view of the slip, on the line 6—6 of Figure 4.

Referring now more particularly to the drawings, wherein like numerals of reference designate similar parts in each of the figures, the numeral 1 designates the well casing, which has the casing head 2 secured thereon, and of conventional construction. The upper part of the casing head is enlarged or bowl shaped, as shown, and the transverse diameter thereof may vary in accordance with the size of the casing head in use.

The casing head is permanently attached to the upper end of the casing during pumping operations, and when it is desired to pull the pump tubing, or lower the same down into the casing the tubing slip and spider, herein described, is employed. This device includes a spider formed of two arcuate sections 3 and 4, hinged together at the point 5 by a suitable pin 6, and having the upper and lower marginal flanges 7, 7, and 8, 8. The other ends of the sections intermesh, when in closed position, and are secured together by a removable pin 9, which passes through the intermeshing ends. These sections, when closed, form an annular spider with a central upwardly flared opening 10, surrounding the lower end of which there is an annular rib 11, formed integrally with the respective sections of the bowl. This rib fits down within the casing head, and its lower end is flared, as at 12, to form a guide for the couplings connecting the joints of tubing, so that they will not hang against the underside of the spider. The rib 11 also prevents the spider from becoming displaced, by lateral movement, from the casing head.

The sections 3 and 4, have the anchor pins 13, 13, anchored at their respective ends to the respective upper and lower flanges 7 and 8. A chain 14 is anchored, at one end, to one pin 13, and wrapped around one of the discharge pipes 15, leading from the casing head and then passed around one side of the casing head and wrapped around the other discharge pipe 15, and its other end is then attached to a suitable hook 16, which is anchored to the other anchor pin 13. The chain has an extended end 17, which is attached to the pin 9, to prevent its loss.

The spider is thus securely held attached

to the casing head while in use, but the chain 14, being flexible, permits the spider to move relative to the casing head, within a limited range so as to permit a limited amount of lateral movement of the tubing, as the same is being handled, thus making the device more flexible and the rib 11, depending into the casing head, but being smaller in diameter than said casing head serves as a stop to fix or limit, said range of movement, in either direction.

In connection with the spider the tubing slips, presently to be described are used. These slips are composed of two sections, 19, 19, arcuate in form, and hinged together, at one side. At the other side the sections have the extended handles 20, 20, by means of which the slip may be opened and closed, and the handles are of sufficient length that, in handling the slips the workmen need not go under the elevator, holding the tubing, thus making the work safer for them. The sections are held in alignment when closed by the stud 21 carried by the free end of one which fits into a socket 22, in the free end of the other.

The numerals 23 designate the slip jaws, which are arcuate in horizontal cross section and whose outer sides have arcuate dovetailed grooves 24, which receive the inner dovetailed edges of the sections 19 there being preferably two jaws carried by each section. When the jaws are fitted into place on the slip sections, set screws 25 are screwed into said sections with the screw heads fitting loosely into the vertical grooves 26 in the outer sides of the jaws, to keep the jaws in place. The jaws thus have a limited circumferential movement on their respective sections. The jaws are extended vertically to give them the required length thus providing the necessary strength as well as tubing-holding surface. The inner sides of the jaws are toothed, the teeth of the jaws being slightly inclined or spiralled, and the teeth of some of the jaws inclining in the direction opposite of the inclination of the teeth of other jaws. This inclination enables the teeth to more securely hold the tubing against turning, in making up or breaking up the same, and consequently protects the tubing from becoming mutilated by the teeth.

The lower ends of the jaws are tapered inwardly, so that when the slip is closed around the tubing the lower ends of the jaws will enter and form a perfect seat in the opening 10 of the spider, and their extreme lower ends are rounded off or beveled, as at 28, so as to more readily enter said opening. The upper ends of the jaws are also tapered, as shown, for economy in material and for the sake of lightness.

In use, the spider is mounted on the casing head, as shown, and the slips, when not gripping the tubing, are partly opened, and their lower ends rest upon the spider thus holding them in readiness for use. When it is desired to catch the tubing and hold it the handles 20 are moved together and the lower ends of the jaws drop into the opening 10, and the jaws grip and hold the pipe. The jaws, being anchored together as explained, all drop together and when they grip the tubing, they engage with it uniformly all the way around. They do not thus bend or dent the tubing as would be the case were some of the jaws to drop ahead of the others.

In order to release the slip the tubing is pulled upwardly until the lower ends of the jaws clear the top of the spider and the slip is then opened suddenly to seat the jaws on top of said bowl and in readiness for use again.

The sectional form of the jaws, and the provision for their circumferential play on the slip sections 19, permit them to conform to the shape of the pipe, and also to prevent them from wedging and sticking on the pipe, as would be the case if they were semicircular.

What I claim is:—

1. A device of the character described including a sectional spider having an upwardly flared central opening, flexible means connecting said spider to a casing head so as to permit a limited radial movement of the bowl, and a tubing slip adapted to seat in said opening.

2. A device of the character described including a sectional spider adapted to seat on a casing head, and having an upwardly flared central opening, a flexible securing member connecting said spider to the casing head and a sectional tubing slip adapted to seat in said opening.

3. A device of the character described including a spider adapted to seat on a casing head and formed of two arcuate sections hinged together at one end, means for detachably securing the other ends of said sections together, said spider having an upwardly flared central opening, flexible means connecting the spider to said casing head by permitting a limited lateral movement of said spider on said head, and a tubing slip adapted to seat in said opening.

4. A device of the character described including a sectional spider adapted to seat on a casing head having an upwardly flared central opening, flexible means limiting the lateral movement of the spider relative to said head, and a sectional tubing slip adapted to seat in said opening, and formed with detachable jaws, arcuate in cross section and whose inner sides have engaging teeth.

5. A device of the character described including a sectional spider adapted to seat on a tubular support and having a smooth

central bore whose upper end is flared, a depending rib carried thereby around the bore and forming a stop to limit the lateral movement of the spider on said support and a tubing slip conforming to the contour of and adapted to seat in the flared upper end of said bore.

6. A device of the character described including a sectional spider adapted to seat on a tubular support and having an upwardly flared central opening, an annular rib depending therefrom into said support and surrounding the opening whose inner side is outwardly beveled, forming a guide, a flexible member securing the spider on the support and a tubing slip adapted to seat in said opening.

7. A device of the character described including a spider having a central upwardly flared opening, said spider being formed of sections hinged together at one side, means detachably securing the sections together at the other side, a tubing slip formed of sections hinged together, at one side, outwardly extending handles carried by the respective slip sections at the other side, tubing engaging jaws in said slip sections whose lower ends are formed to seat in said opening.

8. A device of the character described including a sectional spider adapted to seat on a casing head and having an upwardly flared central opening, an annular rib on the spider around said opening and depending into the casing head, a tubing slip formed to fit into said opening, and means for securing the spider to said casing head.

9. A device of the character described including a spider having a central upwardly flared opening, said spider being formed of sections hinged together at one side, means detachably securing the sections together at the other side, a tubing slip formed of sections hinged together, at one side, outwardly extending handles carried by the respective slip sections at the other side, tubing engaging jaws in said slip sections whose lower ends are formed to seat in said opening, and means for securing the spider to a casing head.

10. A device of the character described including a sectional spider having an upwardly flared central opening and adapted to be mounted on a casing head, and adapted to move laterally relative thereto, a flexible member maintaining the spider on the casing head, depending means carried by the bowl and arranged around said opening to limit the lateral movement of the spider on the casing head, and a tubing slip adapted to seat in said opening.

11. A device of the character described including a sectional spider having an upwardly flared central opening and adapted to be mounted on a casing head, means arranged around said opening and depending from the spider down into said casing head to limit the lateral movement of the spider on the casing head, means for securing the spider on the casing head, a tubing slip formed of sections and adapted to seat in said opening.

12. In a device of the character described a spider adapted to seat on a tubular support, and having a vertical opening, a member securing said spider on said support, but permitting the lateral movement thereof on the support, means carried by the spider to limit said movement.

13. In a device of the character described a spider adapted to seat on a tubular support and having a vertical opening, a member connecting the spider to said support, but admitting of a lateral movement of the spider on said support, means depending from the spider and limiting the lateral movement of the spider on the support.

14. In a device of the character described a spider, adapted to seat on a tubular support, and having a vertical opening, a member securing said spider on said support, but permitting the lateral movement thereof on the support, means carried by the spider to limit said movement, and a tubing slip adapted to seat in the spider opening.

15. In a device of the character described a spider adapted to seat on a tubular support and having a vertical opening, a member connecting the spider to said support, but admitting of a lateral movement of the spider on said support, means depending from the spider and limiting the lateral movement of the spider on the support, and a tubing slip adapted to seat in the spider opening.

16. In a device of the character described a spider having a central opening and adapted to seat on a tubular support, and a flexible tie member adapted to secure the spider against displacement from its support.

17. In a device of the character described a spider having a vertical, pipe receiving opening, and adapted to seat on a tubular support, means for securing said spider on said support, said means being adapted to permit radial movement, within a limited range, of said spider, on said support.

18. In a device of the character described a tubing slip adapted to seat in a spider opening and formed with oppositely disposed, confronting sections operatively pivoted to each other at one end, and having handles at the other end and a plurality of elongated jaws carried by each of said sections, and extended lengthwise beyond the sections to increase the tubing gripping surface, and whose lower ends are tapered and thus formed to seat in said opening.

19. A device of the character described including a spider having a central opening and adapted to rest on a tubular support, means adapted to maintain the spider against displacement from said support, a detachable tubing slip formed of sections and adapted to be seated in said opening, the sections of said slip being hinged together and means for swinging said sections toward and from each other on said hinge.

20. A spider adapted to seat on a tubular support and formed with a vertical opening, and capable of lateral movement on said support and means permitting said movement but limiting the range thereof, said means including a stop depending from the spider into said support and a tie-member connecting said spider to said support.

21. A tubing slip adapted to seat in a spider opening and formed with oppositely disposed sections, pivoted together at one end and having handles at their other ends, the facing sides of said sections being arcuate, a plurality of elongated jaws carried on the inner sides of each of said sections and extended beneath the sections and tapering downwardly to seat in said opening, each jaw being anchored to its section by means of a tenon and motise connection, and having, a limited circumferential movement thereon.

22. A tubing slip adapted to seat in a spider opening and including oppositely disposed sections pivoted together at one end, handles carried by the other ends of said sections, arcuate tenons on the insides of said sections, a plurality of jaws carried by each of said sections and formed with arcuate external grooves adapted to receive said respective tenons, said jaws being extended beneath said sections to seat in said opening.

23. A tubing slip adapted to seat in a spider opening and including oppositely disposed sections pivoted together at one end, handles carried by the other ends of said sections, the facing sides of the sections being arcuate, jaws carried by said arcuate sides of said sections and extended beneath the sections and tapered downwardly to seat in said opening, some of said jaws having a limited circumferential movement with respect to the arcuate portion of the corresponding section.

In testimony whereof I have signed my name to this specification.

JEDDY D. NIXON.