

May 16, 1933.

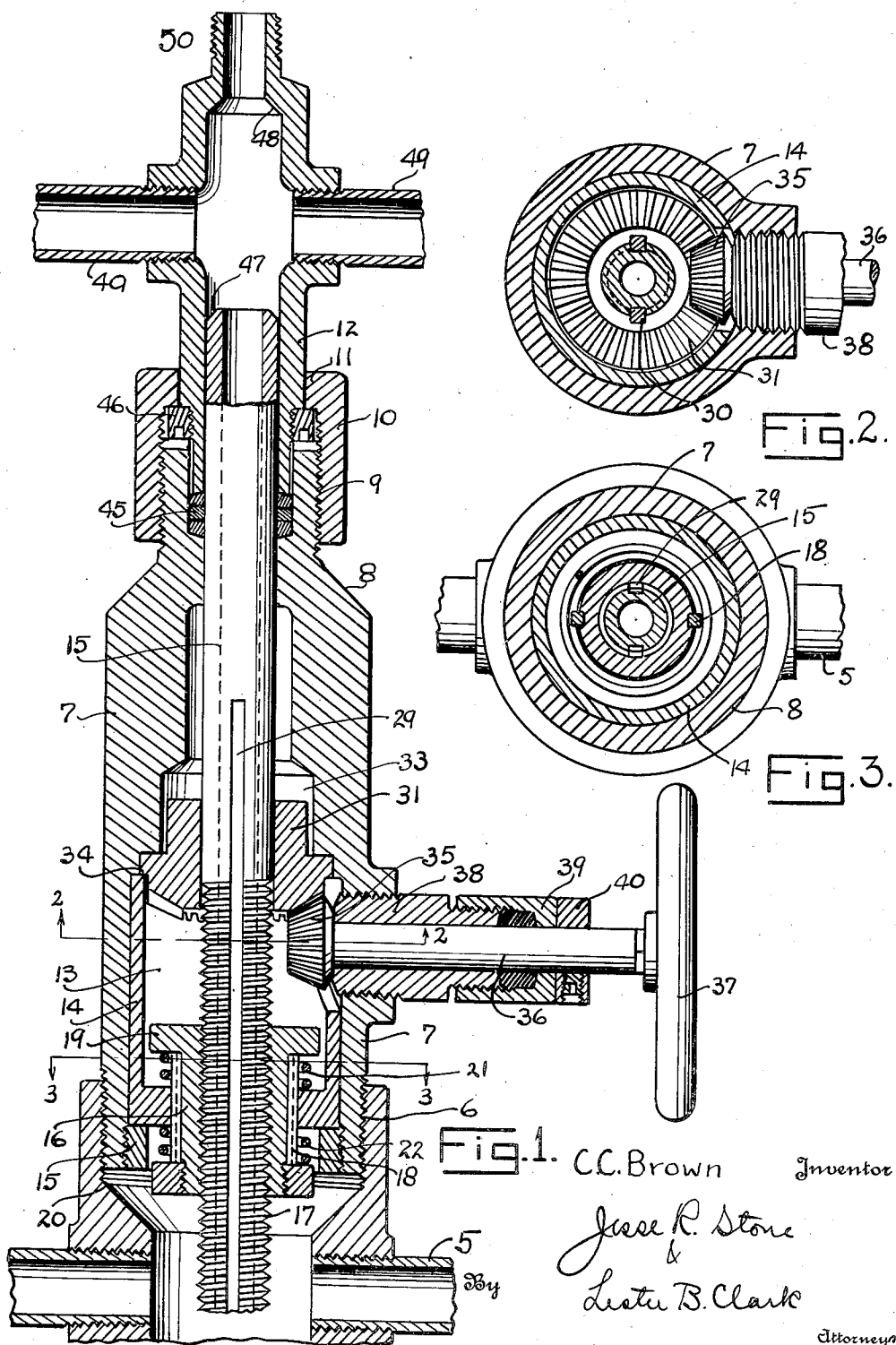
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1,908,818

TUBING SCREWING DEVICE

Filed May 25, 1931

2 Sheets-Sheet 1



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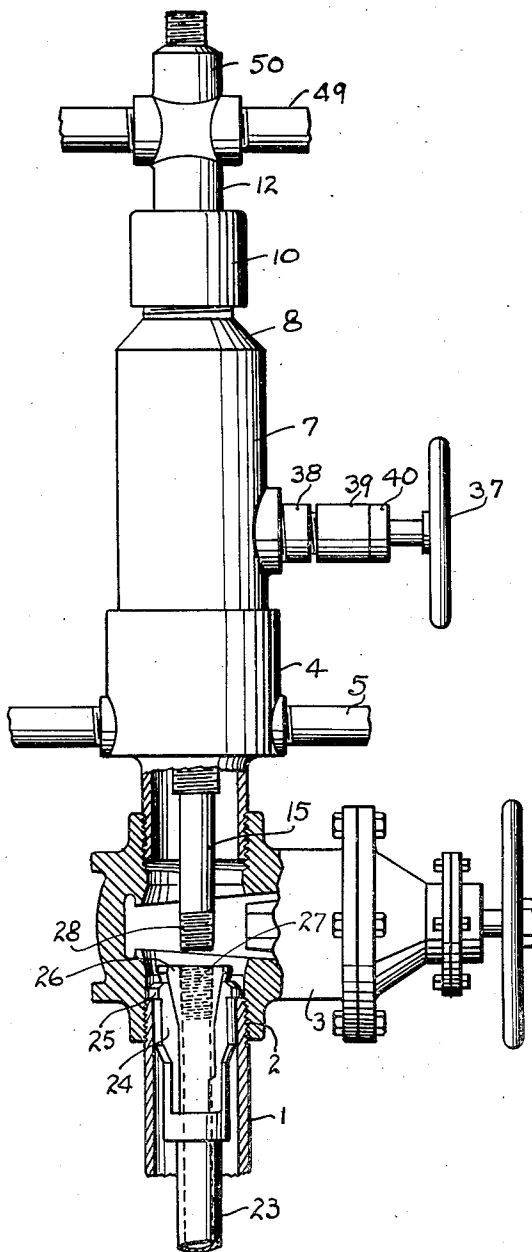


Fig. 4.

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TUBING SCREWING DEVICE

Application filed May 25, 1931. Serial No. 539,653.

My invention relates to well head equipment for use in equipping the upper end of the well in deep well operations for oil, gas and the like. It has particular reference to means for screwing together a joint in the tubing adjacent the upper end of the casing.

In equipping wells for production after the well has been drilled and the casing set it is customary to provide a tubing or flow-line in the well of smaller diameter than the casing and extending down to a point adjacent the lower end of the well and projecting up through the casing head for connection with the christmas tree or flow lines ordinarily provided for distributing the oil or gas to the proper storage. When the well is thus equipped it sometimes becomes desirable to close off the upper end of the casing to seal the upper end of the well while repairs are being made on the valves, fittings or pipes connected with the distribution of the oil from the well. If the oil is being produced under pressure, this is a difficult matter to handle. In a prior application of mine, Serial No. 413,475, filed Dec. 12, 1929, I have shown a means of parting the tubing adjacent the upper end of the casing and closing a gate valve across the casing so as to seal off the upper end of said casing and allow operations to be performed upon any portion of the well head equipment.

My present invention contemplates the screwing together of a joint in the tubing adjacent the gate valve and to provide means whereby this may be done mechanically and accurately so that the threads upon the pipe will engage in the threads in the coupling without difficulty.

I provide a threaded joint between the lower and upper sections of the tubing and then screw the upper end of the tubing to or from this connection and provide resilient means to allow play longitudinally between the two sections of pipe while the joint is being made.

Under ordinary circumstances, if the upper section of tubing is forced downwardly and rotated at a certain rate of speed it will only engage with the threaded connection at the upper end of the lower section when

the threads accurately interfit when the pipe sections come together, but with my resilient connection between the operating means and the upper section the longitudinal movement of the upper section may be delayed until the connection is properly made.

The invention lies in the particular construction and arrangement of the device whereby the upper section is moved and rotated to screw the two parts of the tubing together.

In the drawings herewith Fig. 1 is a central vertical section through the tubing screwing device involving my invention.

Fig. 2 is a transverse section on the plane 2-2 of Fig. 1.

Fig. 3 is a similar transverse section on the plane 3-3 of Fig. 1.

Fig. 4 is a side view partly in elevation and partly in section illustrating my device in assembled position on the well casing.

With reference particularly to Fig. 4 the well casing is shown at 1. It is connected at its upper end at 2 to a gate valve 3. The upper end of said valve is connected with the casing head 4. Said casing head has a plurality of lateral openings therein to receive the pipes 5 by means of which fluid from the well may flow.

My invention is connected with the upper end of the casing head. Said casing head has an inner threaded area 6 into which is screwed the housing 7, to which my improvement is connected. Said housing is a cylindrical member, the upper end of which is reduced in diameter at 8 and is connected at 9 to a threaded collar 10 provided with an inwardly extending flange 11 at the upper end, which fits closely about the lower end of the fitting 12.

Within the housing 7 adjacent the lower end thereof is an enlarged chamber 13 cylindrical in general outline and adapted to receive a cup shaped bushing 14. The lower end of said bushing rests upon a threaded ring 15 screwed within the lower end of the chamber 13. The bushing 14 is connected at its lower end with a nut 16, which is threaded with a coarse thread to engage with the threaded portion 17 of the tubing section 15.

The connection between the bushing 14 and the nut is a non-rotatable one, there being keys 18 on opposite sides of the nut engaging within key ways in the bushing. The nut 5 has radial flanges 19 and 20 at its upper and lower ends, respectively, the lower flange 20 being removable.

The nut is spaced resiliently relative to the bushing by means of spring 21 above the lower end of the bushing and spring 22 below the same. It will thus be seen that the nut has a resilient longitudinal play relative to the bushing due to the springs 21 and 22.

The well tubing shown at 23 in Fig. 4 extends upwardly and is supported at the upper end of the casing 1. This support is by means of a slip 24 having an engagement between an upper flange 25 thereon and the upper end of the casing. The tubing 23 has a head 26 on the upper end tapered to fit within the slips and be supported thereby, holding the slips in engagement with the upper end of the casing. This lower section of the tubing is provided with a threaded socket 27 therein for connection with the upper section of tubing 15 previously referred to. The lower end of the upper section is threaded at 28 to fit the socket 27.

Referring to Fig. 1 it will be seen that the upper section 25 of the tubing is threaded with a coarse thread at 17 as previously noted and has a pair of longitudinal key ways 29 therein to receive keys 30 upon a gear 31 fitted about the upper section.

The gear 31 is a small pinion shaped to fit within an upper chamber 33 in the housing, the lower end having a shoulder 34 engaging upon the upper end of the bushing 14 by means of which it is supported. This pinion is slidable upon the tubing but its rotation will cause relative rotation of the tubing through the connection of the keys 30 upon the pinion.

Said pinion is rotated by means of a small gear 35 mounted upon the end of the shaft 36 extending radially outward through the housing and having a handle 37 thereon. Said shaft 36 is supported within a sleeve or bushing 38 screwed within an opening in the housing and having a stuffing box 39 thereon to form a fluid seal about the shaft. Said stuffing box is locked in position by the lock nut or washer 40.

It will now be seen that when the shaft 36 is rotated it will cause the rotation of the pinion 31 and the tubing 15. This rotation will screw the tubing up, or down depending upon the direction of rotation, through the resilient nut 16. When, therefore, the tubing is moved downwardly to screw the lower end 28 into the threaded socket 27 the threads 28 may not accurately engage in the position in which they first contact with the socket 27. If they were screwed rigidly downwardly the threads would not mesh with the threads

in the socket and mutilation of the threads without engagement of the two parts of the tubing would result. However, the upper section will not be forced rigidly into the socket for the reason that the driving connection between the nut 16 and the tubing is a resilient one allowing the tubing 15 to rotate around on the upper end of the socket 27 until the meshing of the threads occurs and will then screw the two sections of the tubing together and the pitch of the threads on the end 28 do not need to be exactly of the same pitch or in exact registration with the threaded area 17 through which the section is moved and threaded.

The upper end 8 of the housing fits about the upper section 15 of the tubing which is slidable therein through a packing 45 which is held in place in the upper end of the housing by means of the contact therewith of the lower end of the fitting 12. It will be seen that a threaded ring 46 on the fitting allows a swivel connection between the sleeve or cap 10 and the head fitting. The upper end of the section 15 extends slidably into the lower end of the fitting 12 and there is hence a slidable connection of the upper section 15 with the fitting. The upper end of the tubing is beveled at 47 to fit within a seat 48 at the upper end of the fitting 12. There are the usual lateral outlets 49 and the upper outlets 50 on the fitting.

My invention allows the parting of the tubing when desired by the rotation and unscrewing of the upper section relative to the lower section so that the gate valve 3 may be closed. This closing of the gate valve will allow repairs to be made upon the flow lines 5 in the casing head or on the flow lines 49 or 50 in the Christmas tree. By the use of my invention the connection between the two sections of tubing may be threaded at 1 and danger of leakage at that point is obviated.

What I claim as new is:

1. A well casing, a gate valve thereon, a casing head on said valve, means closing the upper end of said casing head, a tubing extending through said closing means including a lower section in said casing, an upper section telescopically engaging in said closing means, a threaded connection between said sections, mechanical means, engaging said upper section to rotate the same and move it longitudinally to screw it into or from connection with said lower section.

2. A well casing, a gate valve thereon, a casing head on said valve, means closing the upper end of said casing head, a tubing extending through said closing means including a lower section in said casing, an upper section telescopically engaging in said closing means, a threaded connection between said sections, mechanical means resiliently mounted in said closing means and engaging said upper section to rotate the same and

move it longitudinally to screw it into or from connection with said lower section.

3. A well casing, a casing head, a housing on said casing head closing the upper end thereon, a well tubing in said casing projecting slidably through the upper end of said housing, a threaded joint in said tubing, a section below said joint and a section above said joint and mechanical means in said housing engaging the upper section to simultaneously move the same vertically and rotate the same to screw up or unscrew said joint.

4. A well casing, a casing head, a housing on said casing head closing the upper end thereof, a well tubing in said casing projecting slidably through the upper end of said housing, a threaded joint in said tubing, a section below said joint and a section above said joint and mechanical means in said housing engaging the upper section to simultaneously move the same vertically and rotate the same to screw up or unscrew said joint, said mechanical means being resiliently connected with said upper section.

5. A well casing, a casing head, a housing on said casing head closing the upper end thereof, a well tubing in said casing projecting slidably through the upper end of said housing, a threaded joint in said tubing, a section below said joint and a section above said joint and mechanical means in said housing engaging the upper section to simultaneously move the same vertically and rotate the same to screw up or unscrew said joint, and automatically adjustable means connected with said mechanical means to permit the threads of said joint to mesh and screw together.

6. A casing for wells, a casing head thereon, a housing connected to said casing head, a well tubing in said casing including a lower section suspended in said casing and having a threaded socket at its upper end, an upper tubing section slidable in said housing and having a fluid tight fit therein, the lower end thereof being threaded to fit said socket, and means to screw and unscrew said upper section into and from said socket.

7. A casing for wells, a casing head thereon, a housing connected to said casing head, a well tubing in said casing including a lower section suspended in said casing and having a threaded socket at its upper end, an upper tubing section slidable in said housing, the lower end thereof being threaded to fit said socket, and means to screw and unscrew said upper section into and from said socket, said means acting to move said upper section away from said lower section whereby said casing may be closed between said sections and means to close said casing.

8. A casing for wells, a casing head thereon, a housing connected to said casing head, a well tubing in said casing including a lower section suspended in said casing and having

a threaded socket at its upper end, an upper tubing section slidable in said housing and having a fluid tight fit therein, the lower end thereof being threaded to fit said socket, a nut having threaded engagement with said upper section, means to rotate said pipe in said nut, and means to resiliently support said nut in said housing.

9. A well casing, means closing the upper end thereof, a tubing in said casing including upper and lower sections, said upper section being slidable in said closing means, a threaded connection in said tubing between said sections and means in said closing means to screw up and unscrew said connection and to separate one section of said tubing from the other.

10. A well casing, means closing the upper end thereof, a tubing section slidable in said closing means, a stuffing box in said closing means about said tubing section, a fitting for conducting fluid from said tubing and into which said tubing section may telescope, the lower end of said fitting forming a gland for said stuffing box and means to force said fitting downwardly into said stuffing box.

11. A well casing, a casing head thereon, a housing upon the upper end of said casing head, a tubing extending through said housing, a seal about said tubing at the upper end of said housing including a stuffing box, a fitting formed to receive and conduct fluid from said tubing and into which said tubing projects, said fitting projecting into said stuffing box, and means to force said fitting tightly into said stuffing box.

In testimony whereof I hereunto affix my signature this 18th day of May, A. D. 1931.

CICERO C. BROWN.

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