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E. G. WHALEY

PRESSURE CONTROL DEVICE FOR USE IN COUPLING OIL WELL CASING

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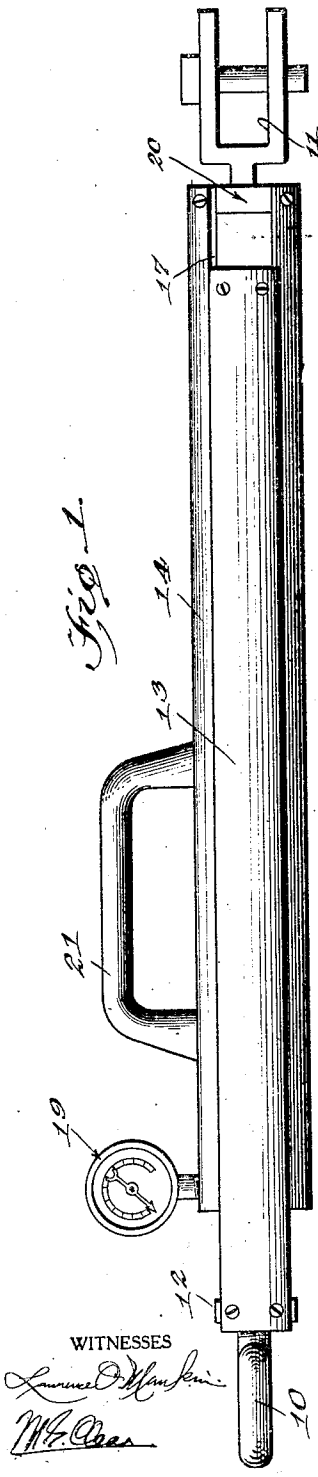


Fig. 1.

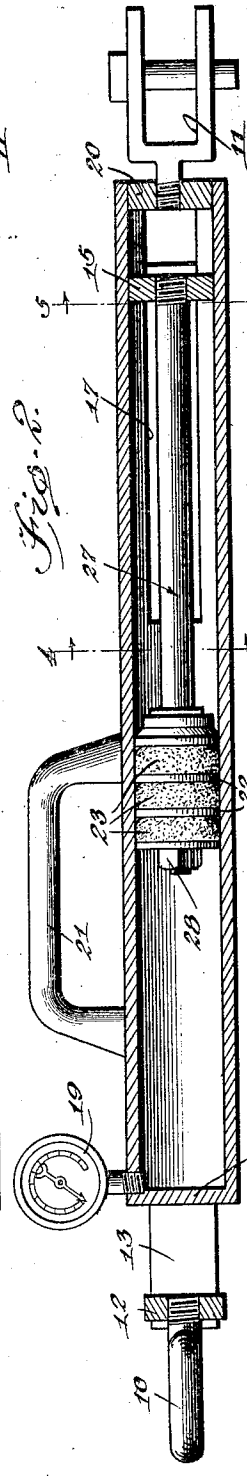


Fig. 2.

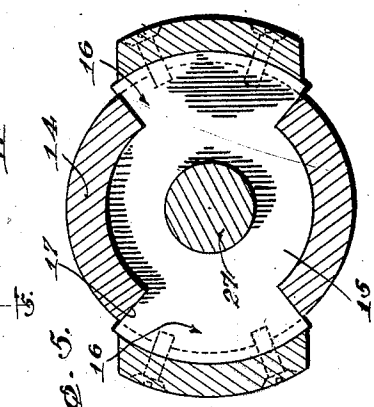


Fig. 5.

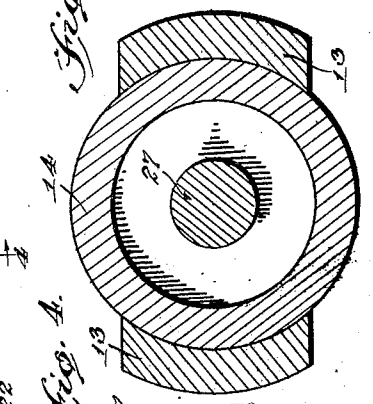


Fig. 4.

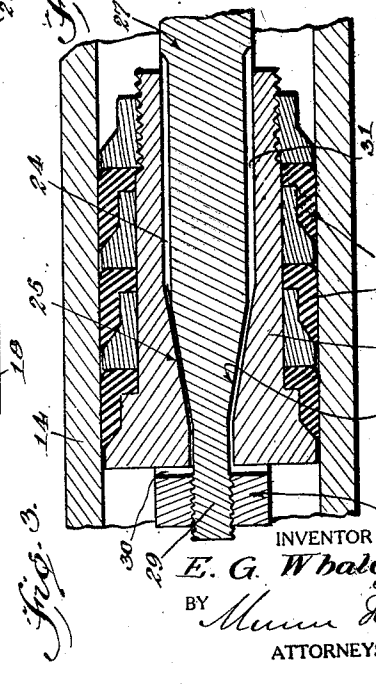


Fig. 3.

WITNESSES

INVENTOR

E. G. Whaley

BY Munn Geo.

ATTORNEYS

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EMERY GRACEY WHALEY, OF ENID, OKLAHOMA, ASSIGNOR OF ONE-HALF TO FRANK EDWARD SACKRIDER, OF ENID, OKLAHOMA.

PRESSURE-CONTROL DEVICE FOR USE IN COUPLING OIL-WELL CASING.

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My present invention relates generally to what is commonly known as "tonging" oil well casing, or in other words, coupling or connecting sections of the casing as it is gradually lowered into the well by virtue of their threaded ends. This is accomplished at the present time in a more or less haphazard manner, which results in turning some joints too tight and others not tight enough. In either instance the results are undesirable as the threads are likely to be ruined by turning the joints too tight, while they are just as likely to be stripped and ruined should the casing come apart in the well at a joint which has been insufficiently tightened.

It is a common practice to withdraw casing from a well and either subsequently utilize it in the same or a different well, and it is obviously an important consideration that the threads be carefully preserved for the above reason. At the present time no means are employed to insure uniform tonging at a desirable pressure, and as a consequence the threads of the casing suffer to a material extent and give rise to considerable unnecessary expense.

My present invention purposes a device adapted to be interposed within the coupling or tonging connections, whereby the pressure may be measured and whereby the joints between the several sections of the casing may be completed in this way uniformly at the correct or desired pressure. In addition, my invention has for its object the provision of an effective efficient device of the above character, which may be made strong and durable, and whereby it is adapted to endure under the severely rough usage to which oil well apparatus is necessarily subjected.

In the accompanying drawing which illustrates my present invention and forms a part of this specification:

Figure 1 is a side elevation of my improved pressure control device;

Figure 2 is a vertical longitudinal section taken therethrough;

Figure 3 is an enlarged detailed section taken longitudinally through a portion of the cylinder or barrel and the piston therein, and,

Figures 4 and 5 are enlarged, detail cross sections taken respectively on lines 4—4 and 5—5 of Figure 2.

Referring now to the figures my invention purposes an apparatus adapted to be interposed within the tonging connections ordinarily employed in the coupling of the sections of oil well casing as the same is lowered into the ground, and having for this purpose a ring 10 at one end for connection to the usual jerk line, and having a clevice-like coupling 11 at its opposite end for connection to the usual tong handle or lever.

The ring 10 is joined to the central portion of a block 12 between and connected to the outer free ends of a pair of connecting bars 13, which extend along opposite sides of a cylinder or barrel 14, and are joined at their inner ends to a cross head 15. As will be seen in Figs. 4 and 5, the connecting bars lay closely alongside the barrel or cylinder 14 and are curved to conform to the contour of this barrel whereby they cooperate with the barrel and form effective efficient guides for the jerk line ring 10.

As will also be seen in Fig. 5, the cross head 15 closely and slidably interfits the barrel or casing 14 and has oppositely projecting side portions 16 projecting through longitudinal side slots 17 of the barrel or casing, these projections 16 slightly flaring as shown, and thus cooperating in the support and guiding of the connecting bars 13, to the inner ends of which side projections 16 of the cross head are directly joined.

The barrel or cylinder 14 has one closed end 18 nearest the jerk line ring 10, and adjacent to its closed end 18, the barrel or cylinder has a pressure gauge 19. Within the opposite end of the cylinder or barrel 14 a block 20 is secured and this block supports the clevice-like coupling 11 before referred to.

The casing or barrel 14 is also provided intermediate its ends with an external handle 21, and has therein a piston 22, preferably provided with multiple rings 23 engaging the inner surface of the barrel or cylinder. The body of this piston, as best seen in Fig. 3, is provided with an axial bore 24, which bore is reduced at one end of the piston and has a tapering portion 25 intermediate the piston ends to cooperate with the tapering portion 26 of a piston rod 27 ex-

tending through the piston bore and having a nut 28 threadedly connected and secured upon its reduced terminal 29 so as to abut one end of the piston. This nut has one surface radially grooved as at 30, so that during retractile movements of the piston, air may find its way into the working chamber between the piston and the closed end 18 of the cylinder or barrel, such air passing through the bore of the piston within longitudinal grooves 31 of the piston rod 27 adjacent to its tapering portion 26, it being understood that during the retractile movement of the piston, its rod 27, moving slightly with respect to the piston so as to shift its tapering surface 26 out of contact with the tapering surface 25 of the piston bore, thus opens communication between the piston rod grooves 31 and the grooves 30 of the rod holding nut 28.

During forward operative movements of the piston to compress the air between the piston and the closed end 18 of the barrel or cylinder, the tapering surfaces 25 and 26 of the piston and its rod, are in engaged relation, whereby to defeat leakage through the piston as the latter moves toward the closed end of the cylinder or barrel.

It is obvious that by virtue of the handle 21, the device as a whole may be readily handled and moved from place to place, as well as manipulated in the connection of the device by virtue of the clevice-like coupling 11 to the usual tonging handle or lever, and its connection by virture of the ring 10 with the usual jerk line.

Then when the jerk line is pulled, it is obvious that through the connecting bars 13, the power is applied to the tonging handle or lever through the air compressed in the working chamber of the barrel or cylinder, between the closed end of the latter and the piston. It is equally obvious such pressure is indicated at all times by the pressure gauge 19, and in this way the exact pressure applied to the tonging handle or lever may be readily seen at all times.

In this way it is obvious that several tonging operations necessary in coupling casing sections to be lowered into a well, may be made uniform, irrespective of the particular character of power utilized for actuating the jerk line, and on account thereof it is insured that all pipe connections may be completed at just the desired pressure, as indicated by the pressure gauge 19, so that the casing threads will be engaged tight enough for proper service, and yet not so tight as to endanger their injury.

The particular device proposed by my invention for the above purposes, while susceptible of various changes and modifications, is obviously capable of being made strong, and durable, in spite of the rough usage to which oil well appliances are necessarily subjected in the field.

I claim:—

1. In a device of the character described, a cylinder or barrel closed at one end and longitudinally slotted adjacent to its opposite end, a coupling member carried by the last mentioned end of the cylinder or barrel, a cross head slidably interfitting the barrel and having projecting side portions extending through the slots thereof, a piston rod connected at one end centrally of said cross head and guided thereby axially of the cylinder, a piston at the other end of the rod movable toward and away from the closed end of the barrel or cylinder and forming therein an air pressure chamber, a pressure indicator carried by the barrel or cylinder in communication with the said chamber, connecting bars extending along opposite sides of the cylinder and connected at one end to the projecting side portions of the cross head and projecting at their opposite ends beyond the closed end of the barrel or cylinder, a coupling member carried by the last mentioned ends of the said connecting bars, said piston having a valvular movement longitudinally of the rod and said connecting bars closely embracing the sides of the barrel or cylinder and transversely curved to present inner concave faces conforming to the contour of the cylinder, whereby to act as guides for the last mentioned coupling member and cooperating with the guiding cross head in use.

2. In a device of the character described, a cylinder or barrel closed at one end and longitudinally slotted adjacent to its opposite end, a coupling member carried by the last mentioned end of the cylinder or barrel, a cross head within the barrel having projecting side portions extending through the slots thereof, a piston rod connected at one end to said cross head, a piston at the other end of the rod movable toward and away from the closed end of the barrel or cylinder and forming therein a working chamber, a pressure indicator carried by the barrel or cylinder in communication with the said working chamber, connecting bars extending along opposite sides of the cylinder and connected at one end to the projecting side portions of the cross head and projecting at their opposite ends beyond the closed end of the barrel or cylinder, a coupling member carried by the last mentioned ends of the said connecting bars, said piston and said rod having relatively movable portions engageable when the piston moves in one direction and shiftable away from one another when the piston moves in the opposite direction.

EMERY GRACEY WHALEY.