P. C. HILL.

THREE-PIECE TUBULAR COUPLING.

APPLICATION FILED NOV. 20, 1915.

1,229,079. Patented June 5, 1917.

Fig. 1

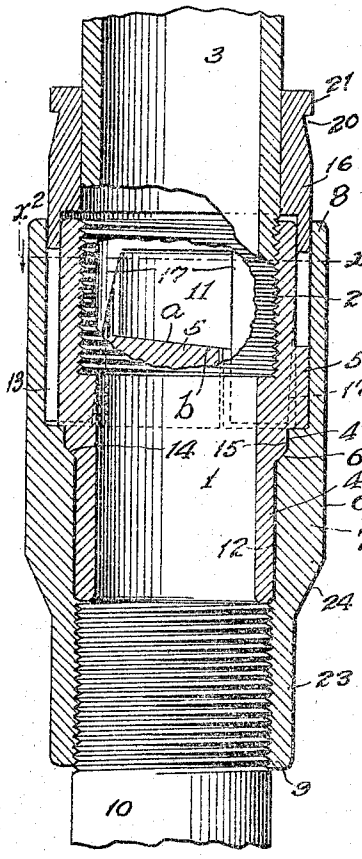


Fig. 3

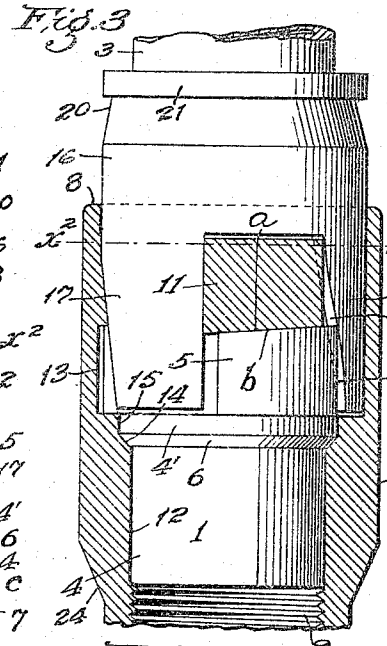


Fig. 5

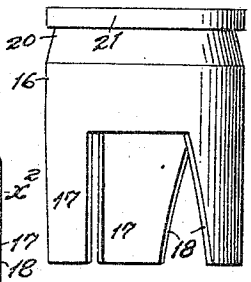


Fig. 6.

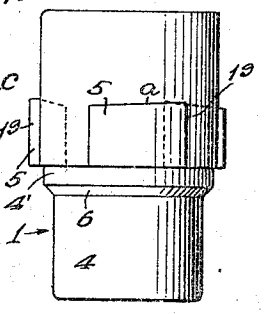


Fig. 4

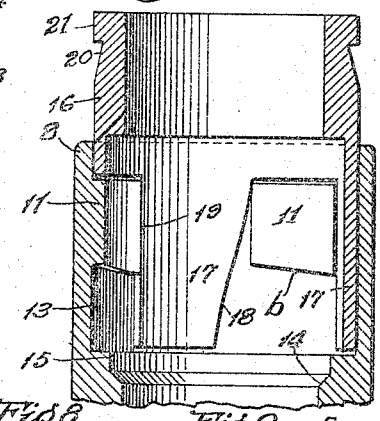


Fig. 7

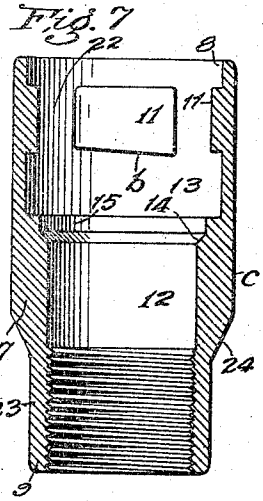


Fig. 2

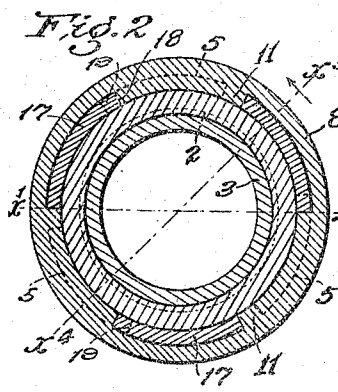


Fig. 8

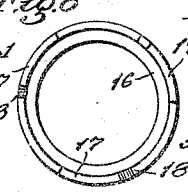


Fig. 9

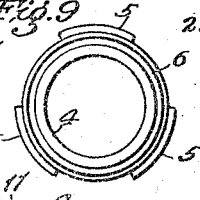
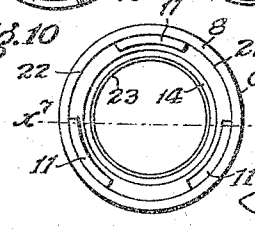


Fig. 10



Witness
L. L. Holly.

Inventor
Paul C. Hill
by James R. Townsend
his atty

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

PAUL C. HILL, OF LOS ANGELES, CALIFORNIA.

THREE-PIECE TUBULAR COUPLING.

1,229,079. Specification of Letters Patent. Patented June 5, 1917.

Application filed November 20, 1915. Serial No. 62,633.

To all whom it may concern:

Be it known that I, PAUL C. HILL, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented a new and useful Improvement in Three-Piece Tubular Couplings, of which the following is a specification.

This invention relates to improvements in couplings patented to me Oct. 13, 1914, by Patent No. 1,113,556.

An object of this improvement is to provide a tubular coupling of great strength and durability, in which all wear is compensated for and which is capable of forming a non-leaking joint under high pressure and adapted to be connected and disconnected with great ease and rapidity and without liability of impairing the tightness of the joint by reason of frequent or multitudinous use.

Other objects and advantages may appear from the subjoined detail description.

The accompanying drawings illustrate the invention.

Figure 1 is a broken longitudinal section of the coupling connected together and uniting two sections of the tubing of a deep well pump.

Fig. 2 is a cross-section on line x^2, Fig. 1.

Fig. 3 is a fragmental elevation partly in section on line x^3—x^4, Fig. 2, one of the internal lugs of the outer member being sectioned on the peripheral radius of the intermediate locking member and shown in place between said locking member and a lug of the inner member.

Fig. 4 is a fragmental section on line indicated by x^3—x^4, Fig. 2, omitting the inner member.

Fig. 5 is an elevation of the intermediate locking member detached.

Fig. 6 is an elevation of the inner member detached.

Fig. 7 is an axial section of the outer member detached.

Fig. 8 is a view of the insertion end of the intermediate locking member.

Fig. 9 is a view of the insertion end of the inner member.

Fig. 10 is a view of the receiving end of the outer member.

Figs. 5, 6, 7 are on a reduced scale and Figs. 8, 9, 10 are on a still further reduced scale.

The internal tubular member 1 is internally threaded as at 2 at one end to receive the threaded end of a well-tubing section 3 and formed into a nipple 4 at the other end and provided between the nipple and the internally threaded seat 2 with external lugs 5, and between said lugs and the nipple with an offset 4′ and a ground tapering shoulder 6. The outer tubular member 7 is constructed at one end 8 to receive the internal member 1 and has an internally threaded section 9 at the other end for connection with the threaded end of the tubing section 10 and is provided between the threaded section 9 and the receiving end 8 with internal lugs 11 to engage the external lugs 5 of the inner member 1; one or both of the engaging edges, *a*, *b*, of the internal and external lugs being spirally arranged. Said outer member is provided between its threaded section and said lugs with a chamber 12 to receive the nipple 4 of the internal member and is provided between said chamber 12 and the internal lugs 11 with a lug-receiving chamber 13 to receive the lugs 5 after they have passed the lugs 11, and provided between said chambers 12 and 13 with a ground seat 14 to seat the ground shoulder 6, and also provided between said chambers 12 and 13 with an intermediate chamber 15 to loosely receive the offset 4′ of the internal member. One or both of the engaging edges *a*, *b* of the lugs 5 and 11 being spirally arranged, the inner and outer members are connected and disconnected by being relatively rotated; the reaction between the lugs 5 and 11 forcing the ground shoulder 6 into the ground seat 14 therefor, as the coupling is made.

The spiral edges of the lugs of either member are symmetrically arranged; corresponding ends thereof terminating in the same cross-sectional plane; and the lugs of each member are spaced apart to admit between them the lugs of the other member.

The chambers 12 and 15 loosely fit the nipple 4 and offset 4′ so as to measurably guide the ground taper shoulder 6 into the ground taper seat 14 without finally interfering with the exact seating of said shoulder 6 in said seat 14 therefor.

The intermediate locking member comprises a tubular body 16 having wedge-like locking prongs 17, to enter between the pairs of contacting lugs 5, 11 when the outer and inner members have been reversely turned to tightly screw said lugs together to force

the taper shoulder 6 and taper seat 14 together. The forward edges 18 of the prongs are aslant to wedgingly engage the rear edges 19 of the external lugs 5 of the internal member. The tubular body 16 forms a sliding fit upon the casing 3, against the end of or in alinement with the inner member, and is at all times above the upper ends of the other two members of the coupling so that proper tools may be used to tighten or loosen the coupling.

The outer end of the locking member is provided with an annular notch 20 terminating at an angular collar 21, the purpose of this notch being to receive a support not shown, upon which the shoulder 21 may rest, so that when the tubing has been raised to withdraw a section from the well, the collar 21 may be held by the support while the tubing is slightly lowered, thus to withdraw the outer member 7 from the intermediate locking member; whereupon a wrench may be applied to the upper section 3 of the tubing, and a back up wrench to the outer member, so that the inner member may be turned to withdraw the lugs 5 and 11 from their engagement with each other, thus allowing the external lugs 5 to be drawn out through the inter-lug spaces 22.

The contacting edges of the internal and external lugs are of corresponding pitch so that when the outer and inner members have been united there is a large area of contacting lug surface to resist the strain and thus the likelihood of jamming or loosening by wear is minimized.

The lower end of the outer member 7 projects from the tubing 10 to receive the elevators by which the tubing is raised and lowered and the intermediate body and upper end of the outer member 7 are cylindrical, and in practice the back-up wrench, not shown, will be applied to the cylindrical portion *c* of the outer member outside of the nipple 4. The lower end 23 of the outer member is of the same thickness as the usual collar for connecting the tubing sections 10, and said outer member enlarges by a tapering swell 24 to a diameter at *c* sufficient to accommodate the chamber 13.

In practical use one of these couplings will be applied to connect determined tubing lengths, which lengths may be made up of two or more sections of tubing; depending upon the length of upended tubing that can be accommodated in the derrick.

The threaded portions of the tubing and coupling members are tightly screwed home so that considerable force is required to loosen them. In contrast thereto the spiral edges of the lugs become loosened under very slight force whenever the prongs of the locking member are withdrawn from between the lugs. Consequently, no care is required to insure that the couplings shall loosen as required irrespective of whether the wrench is placed on the tubing or on the coupling.

When the parts are screwed home and locked or keyed in place by the intermediate member the whole forms a compact joint as shown in Fig. 2 for uniting the tubing sections 3 and 10.

In the form shown each of the members is provided with three lugs, and consequently, the operation of attaching and detaching the joint after the intermediate member has been withdrawn is accomplished by one-sixth of a turn.

I claim:—

A coupling comprising an inner tubular member internally threaded at one end and reduced and formed in a nipple at the other end and provided between the nipple and the internally threaded end with external lugs, the edges of which nearest the internally threaded end are inclined at slight pitch in one direction around said inner member; an outer tubular member constructed at one end to receive the inner member, and internally screw-threaded at the other end and provided between the receiving end and the internal threads with a seat in which said nipple fits and provided between said seat and the receiving end, with internal lugs the edges nearest said seat being adapted to engage the inclined edges of the lugs of the inner member when said members are relatively rotated for that purpose; and an intermediate member having wedging prongs inserted between the lugs to hold the lugs in close engagement with each other.

In testimony whereof, I have hereunto set my hand at Los Angeles, California, this 11th day of November, 1915.

PAUL C. HILL.

Witness:

JAMES R. TOWNSEND.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."