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B. L. PETERSON

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DRILL TOOL JOINT

Filed March 25, 1929

Fig. 1.

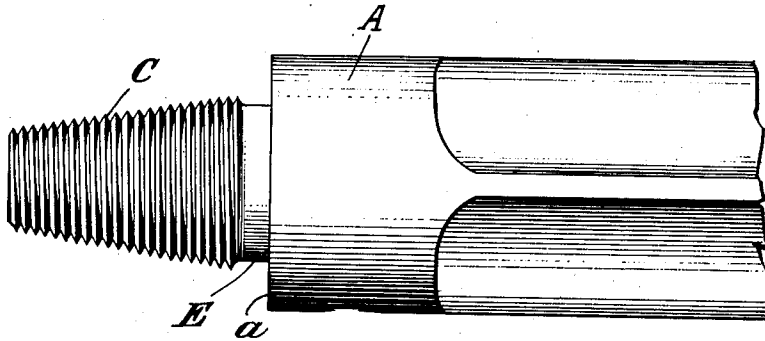
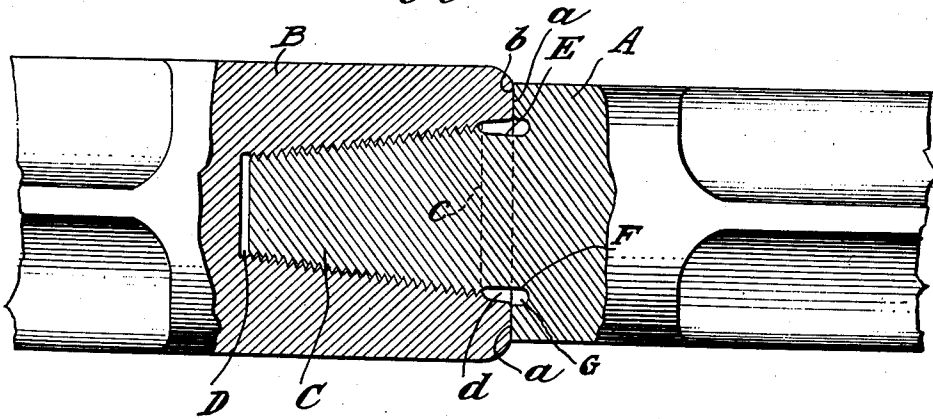


Fig. 2.



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UNITED STATES PATENT OFFICE

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DRILL TOOL JOINT

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My invention relates to improvements in tool joints for use in drilling oil, gas, and artesian wells. Its principal object is to provide improved means for connecting the male and female members of the joint whereby added strength is given to the parts, especially to the male member to prevent breakage thereof when subjected to the great strain in tightening the coupling, and wear and tear of the joint during the drilling process, without the use of a collar as employed heretofore. For, as is well known, there is a tremendous lifting and twist strain upon a tool joint of this character set up when the bit is coupled by means of massive and powerful wrench tools used for the purpose; and this strain, together with the added stress and shock upon the joint when the bit strikes the solid rock requires improved means for the prevention of breakage at this joint.

Continued experiment has demonstrated that, upon severe strain, the tapered threaded male member of the joint is apt to break off at the cut made for the last thread therein at its inner end, and that at this point the strain is excessively great because of the natural pressure and leverage there in the connection with the shoulder of the female member, causing a tendency to break at the bottom of the last thread because it bears all the stress at that point, and the strain is not distributed beyond it; but is centered there, and to overcome this defect, I have provided means to distribute the breaking strain which was previously localized at the last turn of the thread, along an extended portion of the male member or extension, said means comprising a zone of substantial width between the shoulder at the inner end of said extension and the screw thread, said zone being of a diameter no greater than that of the valley of the last turn of the thread.

My invention is illustrated in one specific embodiment, by the accompanying drawing in which similar letters and figures of reference indicate like parts.

Referring thereto, Fig. 1 is a side elevation of the male member of the tool joint; Fig. 2 is a side view of the two members of

the tool joint, united together, and parts cut away to exhibit the interior.

In the figure, A is the male member and B, the female member of the joint; C indicates the tapered threaded end of the part A, which intermeshes with the corresponding threaded cavity D in the usual well known way. E indicates the cylindrical neck or extension of the tapered part C beyond the last thread shown by the dotted line *c*, and *d* indicates the cavity extension into the end of the body portion of the male part A, which terminates with a shoulder at *a*, abutting against the terminus *b* of the female part B. The body portions of the pair of joint members are squared in the usual manner to facilitate screwing the parts together by wrench tools, and the device is particularly applicable to solidly connect the drill pin of an ordinary drill tool of a derrick to the cable end thereof, and is quite simple in construction and inexpensive, as well as stronger than drill joints heretofore employed.

In applicant's joint the incision of the final thread, where breakage usually occurs, is not eliminated, but the tendency to break at this point is overcome largely by the neck construction whereby the shock and stress is taken up by the yielding in the neck as against the old construction in which the stress is taken up in shear alone. In other words, when the lateral forces are applied to applicant's joint the stress is largely taken up in bending or yielding resiliently in the neck, due to the fact that it is out of contact with the socket its entire length, while in the old construction, where the pin is in tight engagement with the socket thruout its length, the stress is entirely taken up in the shear of the final thread, and for this reason the bit is apt to snap off at this weakest point.

Applicant's joint is therefore stronger because the stress is thus divided and distributed to the neck, instead of centering in the incision of the final thread as heretofore.

In like manner the shallow groove around the stem of the male member tends to lessen its rigidity, and thus contributes somewhat to its flexibility and its capacity to sustain

the shock given to the tool joint when operating upon hard substances.

Attention is invited to the fact that the recess or groove G around the inner end of the peripherally-plain neck E, allows said neck to have greater length and hence greater yieldability than could otherwise be produced without removing one or more convolutions of the screw thread from the portion C and consequently weakening the threaded joint. Then too, the groove G located between the neck E and the periphery of the tool section A, separates the shoulder α from said neck and hence renders said shoulder more accessible for grinding and polishing with a stone. It has heretofore been customary to keep the abutting shoulders of the tool sections A and B ground and polished to obtain accurate contact between them, and the required operations in connection with the tool section A, are expedited in the present joint, due to the greater accessibility of the shoulder α . The plain periphery of the neck E forms the inner wall of the groove G and said periphery preferably joins the groove bottom by means of a fillet F to prevent the existence of a sharp corner which would constitute a possible line of fracture.

I claim:

In a well drill coupling member, a cylindrical body having a reduced integral extension at one end, a continuous end-facing groove surrounding the inner end of said extension and a continuous end-facing integral shoulder from the outer wall of said groove to the periphery of said body, said extension having a relatively short peripherally-plain neck portion whose plain periphery forms the inner wall of said groove and merges into the groove bottom by means of a fillet, said extension being tapered from said neck portion to its outer end and having a screw thread which projects beyond the plain periphery of said neck portion, the valley of said thread terminating substantially flush with said plain periphery of said neck portion.

In witness whereof, I hereunto set my hand this 7th day of February, A. D. 1929.

BERT L. PETERSON.