

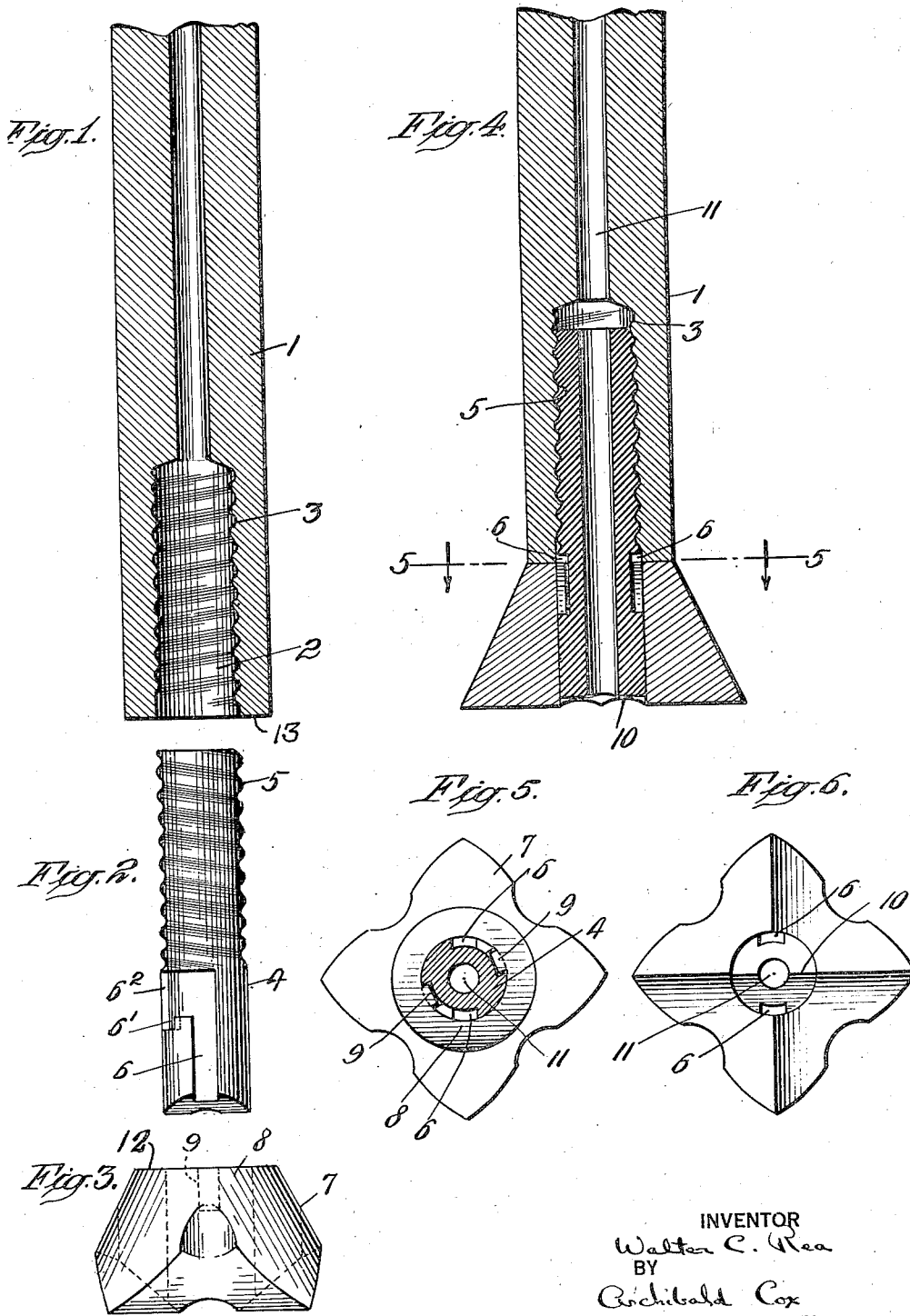
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DRILL

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# UNITED STATES PATENT OFFICE

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## DRILL

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This invention relates to drills of the type comprising a drill rod and a bit detachably carried therewith, and more particularly to means for coupling such rod and bit.

It has already been proposed to use a threaded coupling member to secure a bit to a drill rod in constructions of this character. When such a drill is percussively driven, as is usual, it is desirable that the impacts be transmitted directly from rod to bit or bit to rod, to relieve the coupling and the threads of such forces. At the same time, the tendency of the coupling, due to rotation of the drill, to become wedged or jammed on either the rod or the bit is to be avoided.

The principal object of this invention is therefore, to provide an improved construction whereby these desired advantages are secured and which is simple and inexpensive to manufacture, rugged and durable in service, and capable of being readily disassembled into its parts even after the drilling operation.

Another feature of the present invention is an auxiliary cutting edge, on the end of the member which is used to couple the bit to the drill rod.

Other objects and advantages of the present invention will appear from the following detailed description of a preferred form of drill in accordance therewith, reference being had to the accompanying drawings wherein:

Fig. 1 is a longitudinal section through a portion of a drill rod. Fig. 2 is a side view of a coupling member in accordance with the present invention. Fig. 3 is a side view of a bit for use in connection with a coupling member. Fig. 4 is a longitudinal section through the drill rod, coupling and bit when assembled. Fig. 5 is a section taken on the line 5—5 of Fig. 4 looking in the direction of the arrows. Fig. 6 is an end view of the device as shown in Fig. 4.

There is shown at 1 a portion of a drill rod, which is hollow as at 2, and formed with internal threads 3. A coupling member or stud 4 is formed with threads 5 at one end to cooperate with the threads in the drill rod. At the other end and at opposite sides of the stud, there are formed slots 6 of the usual

bayonet joint type. A bit is shown at 7, formed with an opening 8, and having flanges 9 formed in the opening for cooperation with the slots in the stud.

It will be seen that the hollow portion of the drill rod is threaded to such extent that when the parts are assembled the stud does not abut against the upper end of the rod within the opening. The threads are shown as of the so-called undulating type, but although this form is preferred, it is not essential. These threads are formed so that when the drill rod is rotated in a given direction, in this case counter-clockwise when looking down, the tendency is for the stud to be turned into the drill rod, by reason of the engagement of the flanges 9 with faces 62 of the slots or sockets, so that the bit abuts directly and firmly against the drill rod as shown in Fig. 4. Each socket is provided with the usual reentrant portion 6' whereby the flange is kept from sliding out of the bayonet socket. It is apparent that in order to detach the bit it is only necessary to turn it to unscrew the stud until it can be readily removed from the stud by sliding the flanges through the slots.

It will be appreciated that in the present construction the upper end or face 12 of the bit abuts directly against the lower end or face 13 of the drill rod, and in order to insure such abutment the length of the threads on the stud or coupling member is less than the extent of the threads in the opening in the drill rod. Thus, when the bit and stud are connected by means of the bayonet joint, and the parts are assembled, the stud being screwed into the rod, the bit is caused to seat firmly against the rod, thus insuring direct transmission of impacts from rod to bit. The abutting faces of rod and bit may advantageously be of the same size.

It has been found desirable to provide the stud with a cutting edge 10 so that when the cutting edges of the bit are worn away the stud may act as an auxiliary bit. A passage 11 is formed in the rod and a passage 12 in the stud to permit fluid to flow there-through as is customary in the art.

Although I have described a specific embodiment of my invention in detail, I do not

wish it to be limited save by the scope of the appended claims.

What I claim as new is:—

1. In a rotary impact drill, the combination of three tubular demountable sections, two of the sections comprising a bit and a drill rod in end to end abutting relation, the bore of the drill rod at the end adjacent the bit being enlarged and the enlarged part threaded, and the other section constituting a male coupling for demountably connecting the bit and drill rod and contained within their assembled outline, said coupling provided at one end with external threads engaging the threads on the drill rod and having the other end smooth and snugly fitting in the bore of the bit and means providing a bayonet joint form of construction between the smooth end of the coupling and the bit, the length of the threads in the drill rod being longer than the threads on the coupling whereby after the bit and coupling are connected by means of the bayonet joint the assembly thus formed may be screwed into the drill rod until the bit contacts firmly with the drill rod in their end to end abutting relation.

2. In a rotary impact drill, the combination of three tubular demountable sections, two of the sections comprising a bit and a drill rod in end to end abutting relation, the bore of the drill rod at the end adjacent the bit being enlarged and the enlarged part threaded, and the other section constituting a male coupling for demountably connecting the bit and drill rod and contained within their assembled outline, said coupling provided at one end with external threads engaging the threads on the drill rod and having the other end smooth and snugly fitting in the bore of the bit and means providing a bayonet joint form of construction between the smooth end of the coupling and the bit, the length of the threads in the drill rod being longer than the threads on the coupling whereby after the bit and coupling are connected by means of the bayonet joint the assembly thus formed may be screwed into the drill rod until the bit contacts firmly with the drill rod in their end to end abutting relation, and the smooth end of the coupling terminating in a cutting edge located relative to the means forming the bayonet joint to bring the cutting edge of the coupling substantially in the plane of the cutting edge of the bit when the bit and coupling are assembled.

3. In a rotary impact drill, the combination of two sections disposed in axial alignment, one constituting a drill rod and the other a bit, and a coupling connecting the drill rod and bit in relatively fixed relation, with a threaded connection between the coupling and one of the sections and a bayonet joint form of connection between the cou-

pling and the other section, said threaded and said bayonet joint connections both movable in the same rotative direction to tighten the same whereby the tendency of the coupling to rotate in one direction will cause both connections to be maintained.

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