

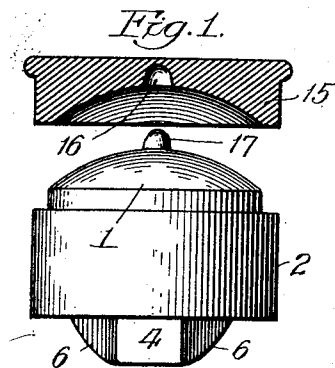
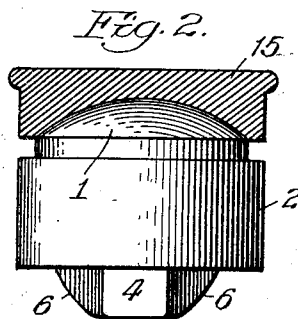
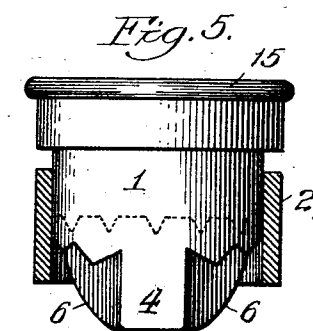
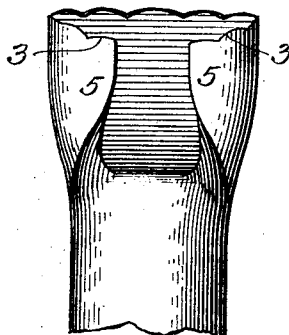
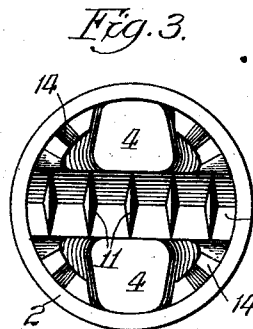
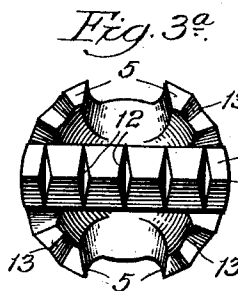
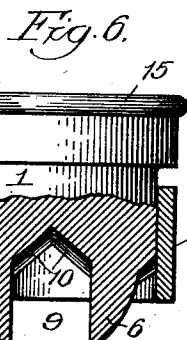
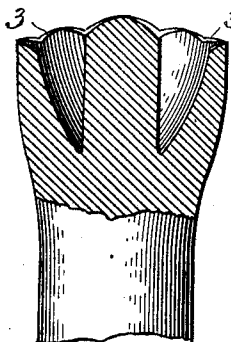
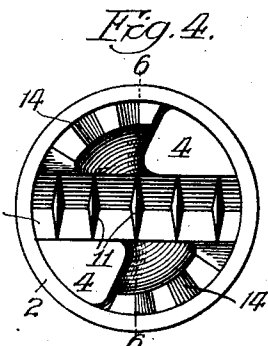
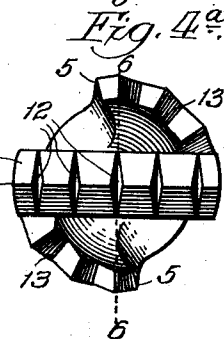
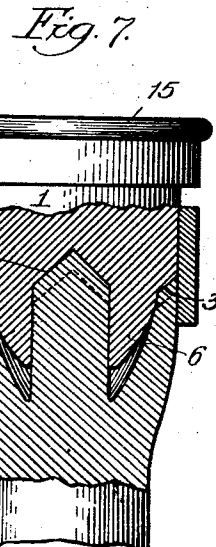
April 13, 1926.

J. P. KARNS

1,580,255

BIT DIE

Filed March 29, 1922



Inventor:
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Att'y.

UNITED STATES PATENT OFFICE.

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LAWRENCE WELL DRILL COMPANY, A CORPORATION OF ARIZONA.

BIT DIE.

Application filed March 29, 1922. Serial No. 547,602.

To all whom it may concern:

Be it known that I, JOHN P. KARNS, a citizen of the United States, residing at Chicago, county of Cook, Illinois, have invented certain new and useful Improvements in Bit Dies, of which the following is a specification.

This invention relates to mechanism for sharpening bits, such as are used in the drilling of wells and the like, and in other rock operations, and comprises among its objects to provide an apparatus which will make it possible to sharpen bits in a much shorter time than has heretofore been possible; to provide means for sharpening drill bits which will make it possible to bring the bits accurately to gauge when sharpening them; to provide, in a structure of the character stated, means for compensating for slight angularity between the sharpening tool and mechanism used to drive the same; to provide means by which the cutting face of a bit may be shaped by a single forging operation; and such further objects, advantages, and capabilities as will later more fully appear.

My invention further resides in the combination, construction, and arrangement of parts illustrated in the accompanying drawing, and while I have shown therein a preferred embodiment I desire the same to be understood as illustrative only and not as limiting my invention.

In the drawing annexed hereto and forming a part hereof,

Fig. 1 is an elevation of one form of my invention, with a portion thereof shown in section.

Fig. 2 is a similar view of another form of my invention.

Fig. 3 is a lower face view of a structure such as shown in either Fig. 1 or Fig. 2.

Fig. 3^a is a face view of a bit such as would be sharpened by the device shown in Fig. 3.

Fig. 4 is a view comparable to Fig. 3 but showing another form of die.

Fig. 4^a is a bit, for the sharpening of which a construction such as that shown in Fig. 4 is used.

Fig. 5 is an elevation of the cutting end of a dull bit such as shown in Fig. 3^a, and illustrating the sharpening die about to be applied to the bit.

Fig. 6 is a broken section substantially

along the plane indicated by the lines 6—6, Figs. 4 and 4^a.

Fig. 7 is a similar view after the bit has been sharpened.

Referring more in detail to the annexed drawing, numeral 1 designates the body of the die member which may have its operative or active face shaped as shown in either Fig. 3 or Fig. 4 or in any other form required by the particular bit which it is desired to sharpen. Secured to the periphery of this die body 1 is a ring 2 which projects below the die face to form a gauge against which the bit may be expanded during the sharpening operation. In this way the trimming edge of the bit, indicated by the numeral 3 may be brought out to such a point that when the bit operates in the hole which it is cutting, said hole will be cut and trimmed accurately. The ring 2 may be put on the body member 1 in any manner desired, but it is now considered preferable to heat the same and place it on the body member while cold so that when the ring cools it will be held firmly in position. In some forms of execution of my invention the gauge ring is dispensed with together with its function.

The body member 1 is preferably provided with guide members 4, which will serve, with one type of bits merely as guiding means to properly position the die with relation to the bit 6, but with other types of bits, such as those shown in this drawing these guide members 4 will serve also as spreaders to force the wings 5 of the bit outwardly against the gauge ring 2. This spreading function is accomplished by means of the wings 6 formed integrally with the guide member 4 and, since they are tapered or wedge-shaped, their natural tendency is to force the trimming wings 5 outwardly when the die is forced longitudinally against the bit to shape and sharpen the end thereof. In those cases in which a gauge ring is not used on the die its place is preferably, though not necessarily, taken by functionally equivalent structure.

The bits shown in the present drawing are provided with centrally arranged bars 7 which are provided with cutting edges 8, as shown most clearly in Figs. 3^a, 4^a and 7. As shown in Figs. 3 and 4 the dies are provided with depressions 9, inclining inwardly as shown in Fig. 6 at 10. Projecting inwardly

into the depressions 9 are ridges 11 which form in members 7 the corresponding notches 12, thus giving to this cutting member a saw-tooth effect. Similar notches 13 are formed in the wings 5 by means of the projections 14 upon the operative face of the die member.

The body member 1 may or may not be rounded as shown in Figs. 1 and 2 and have a cooperating cap 15 as here shown, but it is probably preferable to have the rounded cooperating faces, inasmuch as this permits the cap 15 to slide relatively to the top of the body member in the event that the means used for forcing the die longitudinally against the end of the bits does not happen to press flatly against the flat face of the cap. The latter may be provided with a depression 16 to cooperate with a projection 17 on the top of body member 1, to prevent the cap from sliding off from the body member, though this is not considered essential.

Though the present device is intended primarily for use with large bits, it is not confined in its utility to such structures, as it is also capable of use with bits of small dimensions.

In sharpening a bit of the kind shown in Figs. 3^a and 4^a, it is usual, though not necessary, to hammer out the cutting member 7 to a fairly sharp edge 8 before putting on the die to complete the work. It is of course understood that before either this operation or the final operation of shaping the bits by means of the die can be accomplished it is necessary to thoroughly heat the bit, as is customary in this art. If the bit has not been used to the point where the cutting edge becomes considerably dulled, it may not be necessary to hammer out member 7, as indicated above. After this preliminary step has been completed and the bit is thoroughly heated, it is stood up on the shank end and the die is placed on the cutting end and then a weight of sufficient size, depending upon the size of the bit, will be used to force the die longitudinally of the bit to shape the cutting edge 8 and the trimming wings 5. In the case of a large bit, for example 24 to 30 inches or larger, a weight of approximately two tons may be advantageously used. If such a weight be dropped one or two feet upon the die, it is only necessary that it be dropped two or three times in order that the bit may be completely sharpened and brought to gauge. After this the die is removed and the bit is again tempered. This manner of sharpening bits saves a large percentage of the time heretofore required for such work and results in the bit always being properly sharpened and brought to correct gauge. Instead of placing the die on the bit and dropping a weight thereon, the die may be suspended from the bit, in close proximity thereto, and the two lifted

and dropped in such position that the face of the die opposite the operative face will strike on a hard surface thus eliminating the use of a separate weight and causing the weight of the bit to perform its function.

It is of course understood that the specific description of structure set forth above may be departed from without departing from the spirit of my invention as set forth in this specification and the appended claims.

Having now described my invention, I claim:—

1. A bit shaping die comprising parts arranged for forming on the face of the bit a transversely arranged ridge, and parts arranged laterally with respect to the first named parts for forming wings on the bit laterally of the ridge, said first named parts being provided with projections whereby there will be formed notches in the cutting edge of the ridge.

2. A bit shaping die comprising parts arranged for forming on the face of the bit a transversely arranged ridge, and parts arranged laterally with respect to the first named parts for forming wings on the bit laterally of the ridge, said first named parts being provided with projections whereby there will be formed notches in the cutting edge of the ridge, and means on the face of the die for forming notches in the cutting faces of the wings.

3. A bit shaping die comprising a body member having a transversely extending groove, projections in said groove to form depressions in the bit face, spreaders closely adjacent the sides of the groove and adapted to spread, laterally, portions of the bit to form a shaping face of generally circular contour.

4. In a die, a body member grooved diametrically to form a centrally arranged cutting edge on a bit, spreaders closely adjacent the sides of said groove to force outwardly a portion of the metal of the bit to constitute shaping wings, said die having on some of its shaping faces projections to form notches in the cutting and shaping faces of the bit.

5. In a die, a body member grooved diametrically to form a centrally arranged cutting edge, spreaders closely adjacent the sides of said groove to force outwardly a portion of the metal of the bit to constitute shaping wings, said die having on some of its shaping faces projections to form notches in the cutting and shaping faces of the bit in combination with a gauge ring encircling the body member and secured thereto against which the operating portions of the bit may be spread when being shaped.

6. In a die, a body portion adapted to shape the operating portion of a bit and having its outer face opposite the shaping face convex, in combination with a cap

• adapted to rest on the convex face of the die and having its die engaging face shaped to fit the said convex face of the die.

5 7. In a die, a body member grooved diametrically to form a centrally arranged cutting edge and having means for forming one or more peripherally disposed cutting edges, said die having on some of its shaping faces projections to form notches in some of the
10 cutting edges of the bit.

8. In a die, a body member grooved diametrically to form a centrally arranged cutting edge and having means for forming one or more peripherally disposed cutting edges
15 having the groove for forming the diametrically disposed cutting edge deeper than the portions for forming the peripherally disposed cutting edges.

9. In a die, a body member grooved diametrically to form a centrally arranged

cutting edge and having means for forming one or more peripherally disposed cutting edges, said die having on some of its shaping faces projections to form notches in some of the cutting edges of the bit, and
25 having the groove for forming the diametrically disposed cutting edge deeper than the portions for forming the peripherally disposed cutting edges.

10. In a die, a body member grooved diametrically to form a centrally arranged cutting edge and having means for forming one or more peripherally disposed cutting edges, said die having formed on its operative face tapered projections to form in one or more
35 of the cutting edges of the bit V-shaped notches having sharp cutting edges.

In witness whereof, I hereunto subscribe my name to this specification.

JOHN P. KARNS.