

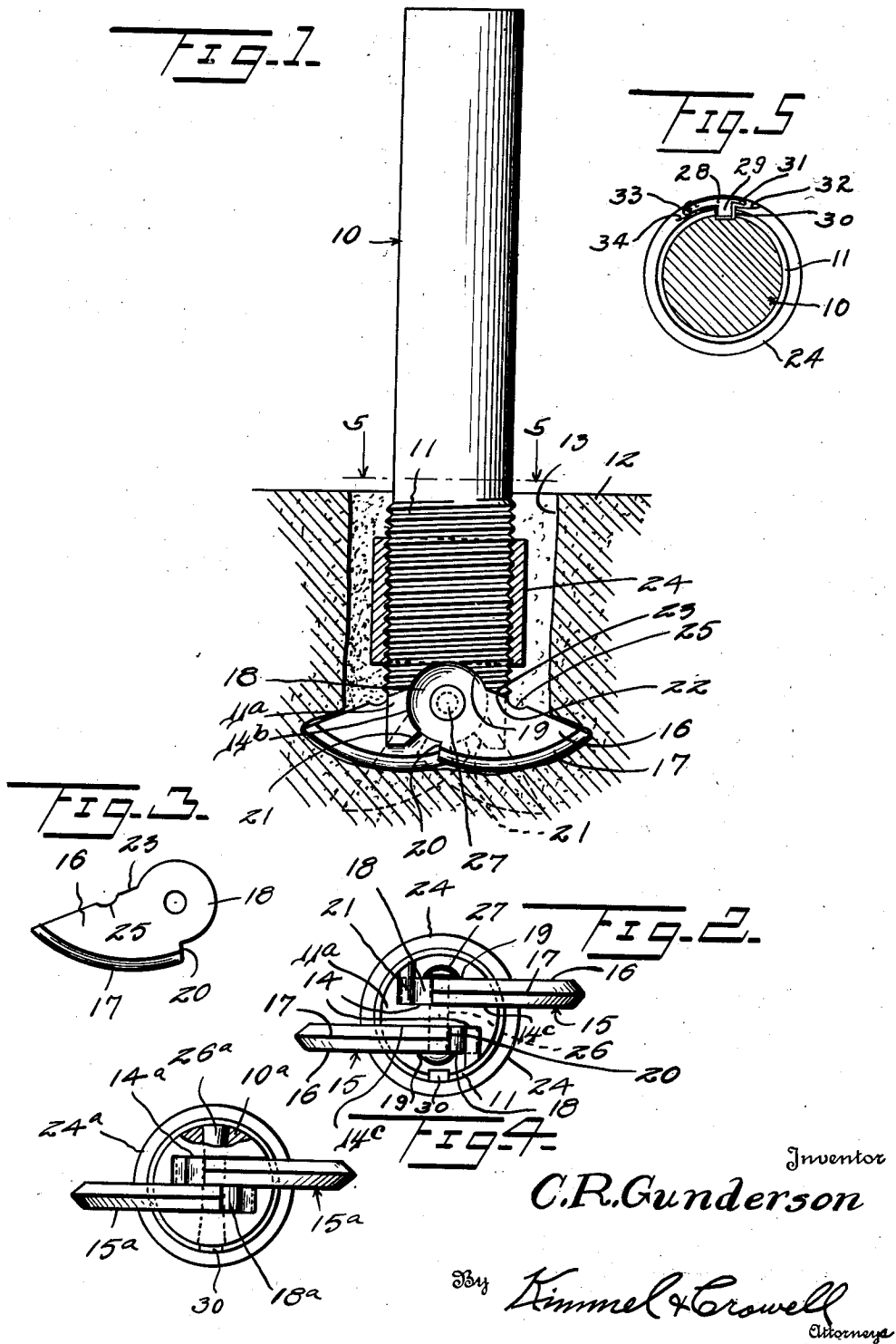
March 12, 1940.

C. R. GUNDERSON

2,193,721

EXPANSION DRILL

Filed April 3, 1939



UNITED STATES PATENT OFFICE

2,193,721

EXPANSION DRILL

Chesley Ray Gunderson, Reno, Nev.

Application April 3, 1939, Serial No. 265,813

3 Claims. (Cl. 255—76)

This invention relates to drills and more particularly to an expanding drill.

An object of this invention is to provide a drill of the expanding type which is adapted to be inserted in a hole already provided in an article for the purpose of forming a substantially larger pocket or recess at the lower or inner end of the hole.

Another object of this invention is to provide a drill of this kind which automatically expands during the movement thereof inwardly of the hole, the degree of expansion or extension of the bits being controlled by a part movable longitudinally of the shank carrying the bits.

A further object of this invention is to provide a bit and drill of this kind which is designed particularly for use in enlarging the bottom or inner end of a hole in concrete, rock, plaster or the like, to admit of the insertion of a toggle or expansion bolt thereby eliminating the necessity of inserting an expanding jacket in the opening assuring a firmer grip between the bolt and the material engaged by the bolt.

A still further object of this invention is to provide a drill and bit of this kind which can be used in conjunction with a rotating means for rotating the drill and bit in the hole or can be used with an impact device, the form of drill operating means depending upon the material in which the drill is inserted.

In the drawing:

Figure 1 is a detail side elevation partly in vertical section of a drill constructed according to an embodiment of this invention.

Figure 2 is a bottom plan view of the drill.

Figure 3 is a detail side elevation of one of the blades or bits.

Figure 4 is a bottom plan partly broken away and in section of a modified form of this drill, and

Figure 5 is a sectional view taken on the line 5—5 of Figure 1.

Referring to the drawing, the numeral 10 designates generally an elongated shank, formed of a part 11 having peripheral threads and a non-peripherally threaded part 11a extending outwardly from the part 11. The shank 10 is adapted to be inserted in a hole or opening 13, which is formed in a body 12 and this body 12 may be in the form of concrete, plaster, rock or other substantially hard material wherein it is desired to embed and secure an anchor or toggle bolt. The opening 13 may initially be formed by any suitable form or type of drill, being extended for the desired depth into the body 12.

At the present time it is the practice where a bolt is to be secured in concrete, plaster, rock or other hard material to form an opening similar to the opening 13 and in this opening an expanding sleeve is inserted, which is adapted to be expanded by a lag bolt or other fastening means. However, it has been found that this type of anchoring means is not entirely satisfactory as the anchoring means frequently becomes loosened under weather conditions or under any vibrations to which the fastening means may be subjected.

The outer end portion of the part 11 of the shank 10 is formed with diametrically opposed substantially semi-circular cavities 19. The part 11a of stem 10 is provided with a pair of oppositely disposed cutouts 14 on opposite sides thereof. Each cutout 14 includes an inner end wall having a curved part 14b forming a continuation of the wall of a cavity 19 and an inclined part forming an abutment 21 extending rearwardly from and disposed at an obtuse angle relative to the outer end of the part 14b. Each cutout 14 includes an inner side wall 14c of a length less than the diameter of the shank 10 and which merges at its inner end into the inner side of the said inner end wall of the cutout. The walls 14c with reference to Figure 2 are spaced from opposite sides of the horizontal median of the part 11a. The inner end walls of the cutouts are spaced from opposite sides of the transverse median of the part 11a. The cutouts 14 open at spaced portions of the periphery of part 11a.

Arranged within and extending from the cutouts 14 are oppositely disposed extendible and retractible bit members or blades 15 of like form, each comprising a body formed of a cutter part 17 having an arcuate V-shaped working edge 17 and a disc-shaped coupling part 18 at the inner end of the part 16. The edge of the part 18 is rotatably engaging the side wall of a cavity 19 and a curved inner end wall portion 14a. The cutter part 16 at the inner end of the edge 17 is provided with a shoulder 20 which is adapted to engage against an abutment 21. The abutments 21 coact with the shoulder 20 to limit the retraction of the blade members 15.

The shank 10 at the outer portion of each cutout 14 is also provided with an abutment or shoulder 22, which is adapted to be engaged by the inner edge 23 of the cutter part 16 to thereby limit the extension or swinging movement of the blades 15. A cylindrical sleeve member 24 is threaded onto the portion 11 of the shank 10 and is movable longitudinally thereof, the outer end of the sleeve 24 being engageable in a recess

25 formed in the cutter part 16 of each blade member 15 so as to thereby form an adjustable blade extension means to limit the extension of the blade members 15 relative to the shank 10.

5 In the present instance, the coupling parts 18 of the blades 15 are pivotally mounted on a common pin 26, which extends through the parts 11a of shank 10 and has the opposite ends thereof upsest as at 27. As shown in Figure 2, the two cutouts 14 are disposed in spaced apart parallel relation, whereas in Figure 4 a slightly modified form of this construction is disclosed, the shank 10a being similar to every detail to the shank 10 with the exception that the outer end thereof is provided with a pair of slots 14a, which at their inner portions communicate one with the other and the two blades or bits 15a have their bearing portions 18a disposed in face abutting relation. In this instance, a tapered pin 26a is extended diametrically across the shank 10a and through the two slots 14a. The opposite ends of the pin or shaft 26a may be upset or enlarged to prevent endwise movement thereof.

The sleeve 24 is locked in adjusted position on 25 the shank 10 by means of a spring-pressed pawl 23 provided with a bill 29 engaging in a longitudinally extending groove or channel 30 formed in the part 11 of the shank 10. The pawl 23 is provided with an extension or finger piece 31 projecting into a cutout 32 provided in the sleeve 24 so that the pawl 23 may be rocked on the pivot 33 against the tension of the spring 34. The pawl 28 is preferably countersunk in a suitable recess provided in the upper or outer end of the sleeve 35 24.

In the use and operation of this drill, the hole 13 is initially formed on the body of material 12 by any suitable form of drill, then the drill comprising the shank 10 and the blades or bits 15 is inserted in the opening 13. Initially the two bits or blades 15 are disposed in collapsed or retracted position, as shown in dotted lines in Figure 1. If desired a hammer or impact device may be engaged with the opposite or inner end of the shank 10. Where a hammer or impact device is used 45 the impact on the shank 10 will tend to spread the two bit members 15 apart at the bottom or inner end of the opening or hole 13. This action will continue until the two bit members 15 swing laterally to the limit permitted either by the abutments 22 or the bit controlling sleeve 24. When the two bits or blades 15 are in their extended position, similar to that shown in full lines in Figure 1, further impact or rotation of the shank 10 and the bits or blades 15 will enlarge the bottom or inner end of the opening 13. In this manner a substantially large diameter pocket will be provided at the inner end of the opening 13 so as to admit of the insertion of either a toggle bolt or, if desired, blasting material may be inserted in the enlarged pocket and the outer portion of the opening 13 closed in the usual manner.

It has been found in actual practice that an enlarged pocket or recess formed by this drill will facilitate any blasting operations as this pocket will permit of a larger quantity of blasting material being positioned at the inner end of the hole and eliminate the action of any blasting material which at present extends toward the outer end of the opening 13.

Where the condition of the material permits,

the drill comprising of shank 10 and the two bits 15 may be connected to or mounted in a chuck or other rotating means so that the bits 15 may be rotated within the opening 13 at the same time that these bits are moved inwardly of the opening 13. By providing the abutments 22 at the outer end of the shank 10 and also providing an arcuate or substantially round socket 19 for the bearing portion 19 of each bit or blade 15, the strain applied to the shank 10 by an impact device or rotating means is taken off of the pin 26. In this manner the pin 26 will not be sheared off by reason of any strain applied to the shank 10 and the bits 15.

Where it is desired to enlarge the pocket at 15 the inner end of the opening 13 to a size substantially smaller than the complete extension of the two bits or blades 15 the sleeve 24 is threaded outwardly so that the outer end of the sleeve 24 forms an adjustable abutment engageable in the 20 recesses 25 of each blade 15.

What I claim is:

1. In an expansion bit of that type including a pair of oppositely disposed blades each having a substantially circular inner portion and a cutter portion having a shoulder at its inner end, said bit comprising a shank having a threaded part intermediate its ends and a non-threaded part extended outwardly from the outer end of said threaded part, said threaded part having its 30 outer terminal portion formed with diametrically opposed substantially semi-circular cavities adapted to receive the inner portions of the blades, said non-threaded part being formed with a pair of oppositely disposed blade receiving cutouts in opposite sides thereof opening at its outer end and at spaced portions of its periphery, said cavities opening into said cutouts, each of said cutouts including an inner end wall formed with a curved part providing a continuation of the wall of a cavity adapted for engaging the edge of an inner portion of a blade, each of cutouts having its inner wall formed with an inclined part disposed at an obtuse angle to the said other part and constituting an abutment for engagement by the shoulder of a blade, and means extending through said non-threaded part and common to inner portions of said blades for pivotally connecting the latter to the shank.

2. The invention as set forth in claim 1 having the threaded part of the shank formed lengthwise thereof with a groove, an adjustable controlling member for the blades threadedly engaging with the threaded part of the shank, and spring-controlled means carried by said member and correlating with said groove for latching said member in adjusted position.

3. In an expansion bit of that type including a pair of controllable oppositely disposed extendible and retractible blades, the combination of a shank provided intermediate its ends with a threaded part and a non-threaded part extending outwardly from the outer end of said threaded part, means for pivotally connecting the blades to said non-threaded part, said threaded part being formed lengthwise thereof with a groove, an adjustable controlling member for said blades threadedly engaging with the said threaded part, and spring-controlled means carried by said member and correlating with said groove for latching said member in adjusted position.

CHESLEY RAY GUNDERSON.