W. E. MINTON.

WELL DRILL BIT.

APPLICATION FILED APR. 5, 1920.

1,372,894. Patented Mar. 29, 1921.

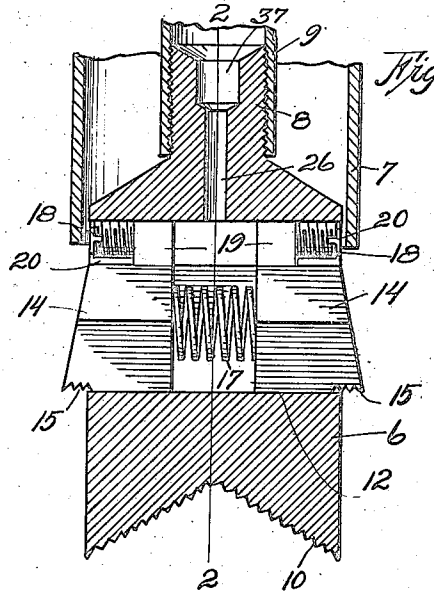


Fig. 1

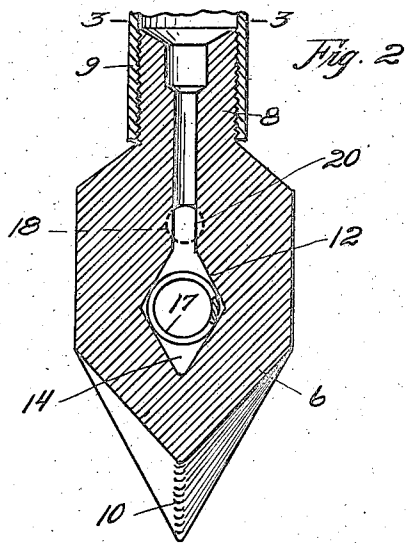


Fig. 2

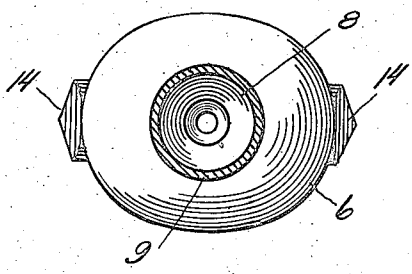


Fig. 3

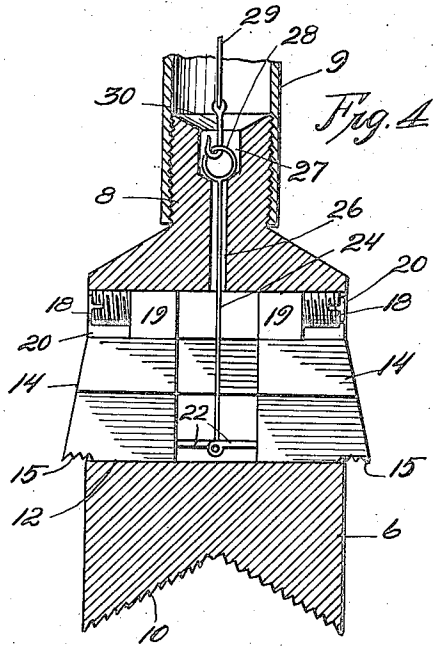


Fig. 4

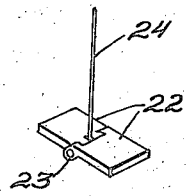


Fig. 5

Witness:

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UNITED STATES PATENT OFFICE.

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WELL-DRILL BIT.

1,372,894. Specification of Letters Patent. Patented Mar. 29, 1921.

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To all whom it may concern:

Be it known that I, WILLIAM E. MINTON, a citizen of the United States, and resident of Kansas City, in the county of Jackson and State of Missouri, have invented a certain new and useful Improvement in Well-Drill Bits, of which the following is a complete specification.

The present invention relates to drilling bit constructions, and aims to provide an improved bit structure adapted for use in deep well drilling operations.

Accordingly one of the objects of the invention is to provide a bit construction in which are mounted a pair of adjustable bit sections adapted to be brought into and out of outwardly projecting relation with reference to the main body portion of the device.

The invention further comprises a structure of the character described in which adjustable stop means are provided for limiting the outwardly projecting movement of the bit sections, together with suitable means for maintaining said bit sections in normal engagement with said stop means.

It is also sought to provide a bit structure of the general character described in which provision is made for contraction of the expansible bit sections by engagement with the interior of the well casing when the device is drawn up out of the well. With these general objects in view, the invention will now be described by reference to the accompanying drawing illustrating suitable forms of embodiment of the proposed improvement, after which the novel features therein will be particularly set forth and claimed.

In the drawing:

Figure 1 is a vertical sectional view illustrating a bit construction embodying the present invention;

Fig. 2 is a similar view taken on the line 2—2 of Fig. 1;

Fig. 3 is a transverse section taken on the line 3—3 of Fig. 2;

Fig. 4 is a vertical sectional view, similar to that shown in Fig. 1, but illustrating the means whereby the bit sections may be allowed to be retracted.

Fig. 5 is a perspective view showing the folding device adapted for maintaining the bit sections in engagement with said stop means.

Referring now to the said drawing in detail, this illustrates the improved bit construction as comprising a main body portion 6 having a maximum diameter adapted to permit the same to be drawn through the interior of a well casing 7. The main body portion 6 is formed with an upper reduced neck portion 8 externally threaded to fit within the lower end of a pipe section 9, which it will be understood forms the operative connection between the bit and the top of the well. Preferably the main body portion 6 has the lower end thereof formed of fish-tail contour, as represented in Figs. 1 and 4, and the bottom edge thereof is formed with a serrated outline, as indicated at 10, for adapting this portion of the structure to fulfil its part of the cutting action in the drilling operation.

Formed transversely in the body portion 6 of the bit, is a transverse passage 12 of substantially diamond section, as shown clearly in Fig. 2 within which passage is mounted a pair of sliding bit sections 14, the contour of said passage and the cross-sectional outline of said bit sections being substantially the same.

The projecting portions of the sections 14 are formed with serrated edges 15, while the outer faces of the sections converge upwardly and inwardly, as represented in Figs. 1 and 4, for the purpose of adapting said sections to be automatically retracted within the passage 12 by engagement with the interior of the well casing 7 whenever the device is drawn upward within said casing. As illustrated in Fig. 1, a coil spring 17 is interposed between the sections 14 for the purpose of maintaining the latter normally spread apart in projecting relation with reference to the body portion 6, and for limiting this spreading movement a pair of stop screws 18 are provided for engagement with the upward extensions 19 from the sections 14, for which a slide passage 20 is provided within the body portion 6, said passage 20 forming in effect a mere extension of the diamond shaped passage 12 already referred to. The screws 18 are threaded in engagement with the side walls of the passage 20, as indicated in Fig. 2.

For maintaining the bit sections 14 in positive engagement with the stop screws 18, I may prefer, under certain conditions, to maintain said sections in positive and unyielding engagement with said stop means. For this purpose I provide a pair of hinged plates 22 connected by a hinged pin 23 (see Fig. 5), the size of said plates 22 being

such that their combined lengths will bridge the space between the sections 14 when the latter are spread apart in engagement with screws 18. The hinged members 22 thus form a toggle bridge between the sections when in the relation shown in Fig. 4, and the arrangement is one which is adapted to permit of a suitable means being employed for breaking the toggle for the purpose of releasing the sections 14 and allowing the same to be contracted within the passage 12 whenever desired. For breaking said toggle, I connect a link 24 to the hinge pin 23, as shown in Figs. 4 and 5, extending this link 24 up through the middle of the passage 20 and up through a central bore 26 through the neck portion of the bit, where a central recess 27 is provided adapted to accommodate an enlarged eye 28 formed on the upper end of said link 24. With this arrangement, a cord or line 29 may be let down within the pipe or tubing 9, said cord being provided with a suitable hook 30 adapted to engage the eye 28 on the link 24, whereby a pull exerted upon the cord 29 will effect the breaking of the toggle to release the bit sections. Preferably the top of the neck portion 8 of the bit is suitably cupped out around the recess 27, facilitating the engagement of the hook 30 with the eye 28 of the link 24.

It will thus be apparent that I have devised a simple and yet efficient form of bit construction having the adjustable bit sections 14 as proposed for the carrying out of the objects of the invention. It will be understood that the said sections are maintained normally in engagement with their stop means 18 in the normal operation of the bit in well drilling operation, the sides of the bit thus coöperating with the bottom contour of the construction for effecting the required drilling operation. The well can thus be started and drilled by the operation of the said bit construction while the casing is let down, following the bit for the purpose of lining the well. When the drilling operation is completed, all that is required is to raise the pipe or tubing 9, whereon the engagement of the outer faces of the sections 14 with the interior of the well casing will at once effect the retraction of said bit sections within the passage 12 and thus permit the entire bit to be drawn up through the casing 7. Or, if desired to maintain the said bit sections in positive engagement with the stop screws 18, this may be done by the provision shown in Fig. 4, comprising the hinged plates 22, which may be collapsed by the link 24 operated through the cord 29 and its hook 30, when the bit construction may be at once lifted up through the casing 7 in the same manner as before. After a well has been drilled, the same can be deepened allowing the casing to be carried on down farther and new casing set in the extension of the well bore formed by the deepening of the well and the construction still be retrieved by virtue of its retractable section in the manner explained.

While I have shown and described what I now regard as the preferred mode of carrying out the invention, I desire to reserve the right to make such changes as may fairly fall within the scope of the following claims.

What I claim is:

1. A well drill bit comprising a main body portion, having a serrated bottom edge, bit sections slidably mounted within said body portion, means acting yieldingly to maintain said sections in outwardly projecting relation with reference to said body portion, adjustable stop means for limiting the outwardly projecting position of said sections, the outer faces of said bit sections converging upwardly, whereby said sections are adapted to be retracted into body portion by engagement with the well casing.

2. A well drill bit comprising a main body portion, having a serrated bottom edge, bit sections slidingly mounted within said body portion, adjustable stop means for limiting the outwardly projecting position of said sections, folding elements adapted to maintain said sections in engagement with said stop means, and means for folding said elements to allow retraction of said bit sections.

In witness whereof I hereto affix my signature.

WILLIAM E. MINTON