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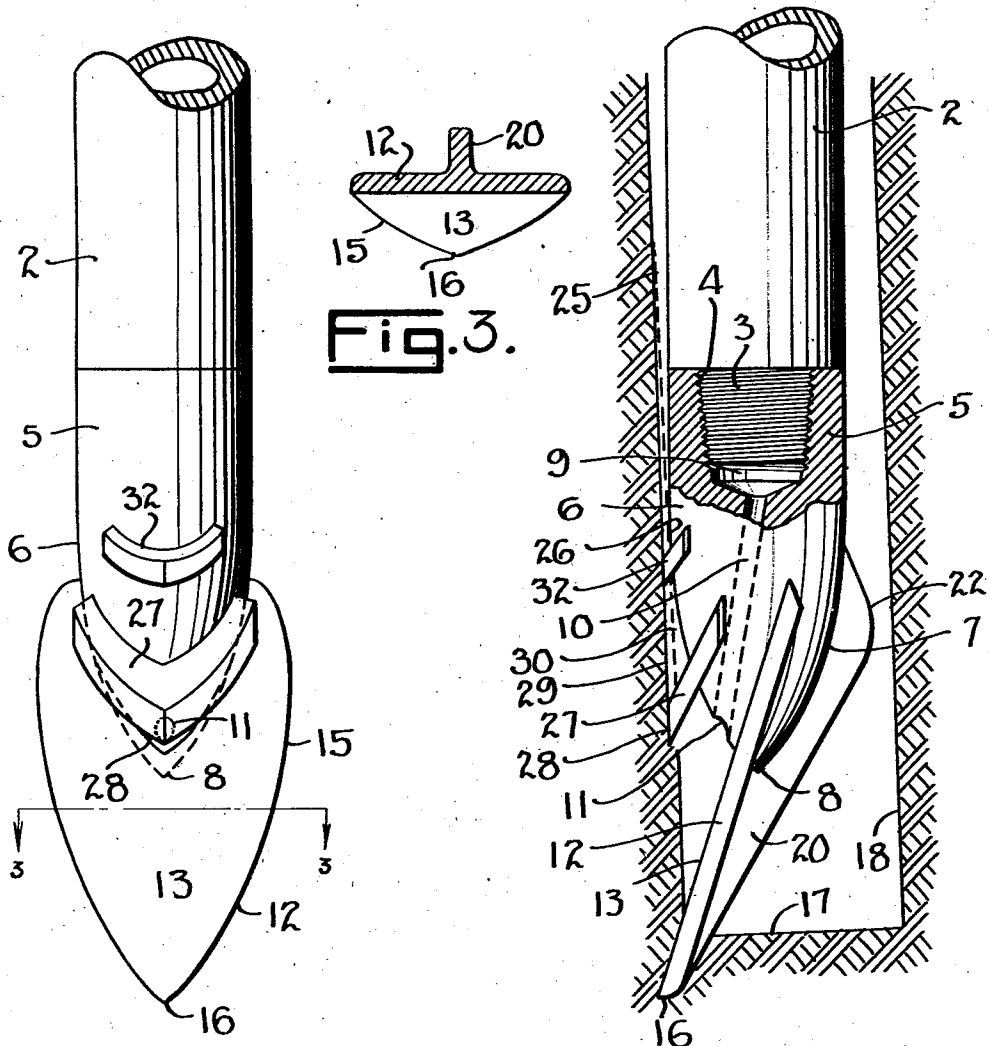


Fig. 1.

Fig. 2.

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DEFLECTING BIT

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5 Claims. (Cl. 255-61)

The invention relates to a spudding bit of a particular type wherein the bit will be deflected laterally in the well bore and at the same time the side of the well bore will be cut or scraped away in the direction of the deflection so as to permit the body of the bit to move an additional lateral distance on each spudding stroke.

It is one of the objects of the invention to provide a spudding bit with a laterally inclined spudding blade.

Another object of the invention is to provide a spudding bit with a spudding blade and scraper blades.

It is also an object of the invention to provide a spudding bit with scraper and spudding blades each of which is inclined at a different angle.

Still another object of the invention is to provide a bit body with downwardly and laterally inclined scraper blades to cut away the side walls of the well bore so as to permit the bit body to move laterally in the well bore.

Still another object of the invention is to provide a method of cutting away the sides of the well bore so as to allow a deflecting tool or spudding bit to move laterally an additional distance on each succeeding stroke.

Other and further objects of the invention will be readily apparent when the following description is considered in connection with the accompanying drawing, wherein:

Fig. 1 is a side elevation looking at the front face of the spudding blade and illustrating the arrangement of the parts.

Fig. 2 is a side elevation taken at right angles to Fig. 1 and illustrating the inclination of the various blades and the position of the spudding bit during its operation in the well bore.

Fig. 3 is a section taken on the line 3-3 to show the position of the reinforcing for the spudding blade.

In Fig. 2 a drill pipe or drill collar is illustrated generally at 2 and may be of any desired size or type which may carry a threaded pin member 3 which is arranged to be engaged in the threaded box member 4 of the spudding bit 5. The parts 3 and 4 may be interposed with respect to the drill pipe and bit if desired.

The bit 5 comprises a body 6 which may be of any desired size and configuration but is here shown as having the lower portion thereof rounded at 7 to form a rather flattened nose 8. A chamber 9 inside of the bit body permits a discharge of drilling fluid through the ports or passages 10 in such a manner that the discharge 11 thereof is adjacent the nose 8 of the bit and

downwardly along the spudding blade 12 so as to wash the blade and keep it in condition for spudding operations.

Attention is directed to the relative inclinations of the passage 10 and the blade 12 as seen in Fig. 2 because this angle causes the drilling fluid to properly wash the face 13 of the spudding blade.

The spudding blade 12 has a rounded configuration as seen in Fig. 1 wherein the sides 15 converge at the point 16 so that this point may be driven in the bottom 17 of a well bore 18.

The blade 12 is reinforced by a web or flange 20, which extends downwardly along the back of the blade as seen in Fig. 3, and also follows the rounded portion 7 of the bit body 6, as seen in Fig. 2. This web may be formed with a heel 22 which is arranged to engage the side of the well bore and normally position the bit 5 in an off-center position in the well bore. This gives the spudding bit an off-center position to begin with as it has just spudded into the bottom of the well bore.

In operation the drill stem 2 is raised and dropped sharply so as to force the point 16 of the spudding blade into the bottom of the well bore. Due to the inclination of this blade with respect to the body and to the reinforcing web 20, it seems obvious that the entire assembly will move laterally and downwardly as the blade 12 penetrates the formation. By continuing this spudding action the blade is driven into the bore and after it has assumed a deflected position, it may be rotated if desired in order to cut away a hole in the deflected direction. During this rotation the heel 22 tends to cut away the well bore so as to substantially maintain the gauge or size of the well bore 18. After the hole has been drilled out to some extent by this rotation, the bit may be again spudded if further deflection is to be accomplished.

In order to permit a maximum deflection with the least number of spudding operations, it is desirable to cut away the side wall 25 of the well bore 18 in the direction in which the deflection is being made, because of the fact that the rounded portion 26 of the bit body 6 will bear against the side wall of the hole as the bit moves laterally. If the bit body bears against the wall then of course the spudding blade 12 cannot move the bit any farther in a lateral direction.

To cut away the side of the well bore a scraper blade 27 has been fixed on the body and as seen in Fig. 1 is somewhat crescent or V-shaped in side elevation to fit around the lower portion of

the bit body 6 and to present a scraper edge 28 which will cut away the side wall, as illustrated in Fig. 1 by the solid line 29, whereas the dotted line 30 illustrates the original side wall before it was scraped away. This blade 27 is inclined at a slightly different angle with respect to the bit body than is the spudding blade 12 because a scraping action is desired rather than a penetrating action.

It should be noted that the port 11 is between the blades 12 and 27 so that this area may not be filled with material scraped from the well bore. An additional scraper blade 32 may be provided at a higher elevation on the bit body 6 if desired and will also tend to scrape away the side of the well bore.

It seems obvious from the foregoing construction that as the bit is reciprocated sharply the scraper blades 27 and 32 will cut away the side wall as the spudding blade 12 causes the bit to move laterally. On the next succeeding stroke, the fact that the side wall has been scraped away permits the bit to make an additional lateral movement on the next succeeding stroke.

This construction permits the deflection of the well bore to be made in a definite direction if the blade 12 is oriented into position or set in the well bore at a predetermined azimuth. The scraper blades thus allow the hole to be started or deflected definitely in the desired position before it is necessary to rotate the blade, whereas if the side wall were not scraped away, it is possible that when the blade were rotated, it might be thrown out of the spudded opening and back into the main portion of the well bore.

Particular attention is directed to the rounded configuration or pointed form of the bit in combination with the heel 22 and the scraper blades 27 and 32 because such structure permits the rotation of the bit after it has been spudded. With other types of spudding bits with a square end or blade no rotation can be had after spudding because the blade is so wide it will not turn after it is wedged into the formation.

Broadly the invention contemplates a spudding bit and scraper blade so that a maximum spudding action can be obtained in a single operation.

What is claimed is:

1. A deflecting bit comprising a rounded body, a blade extending laterally at an inclination across the rounded base of said body, and a pair of spaced scraper blades on the rounded part of said body above said first blade, said scraper

blades each being inclined downwardly at an angle different than said first blade.

2. A bit for deflecting well bores including a body, means thereon to rigidly connect a drill stem thereto, a blade carried by said body, said blade including cutting portions extending laterally from opposite sides of said body to drill a full gage hole upon rotation of the bit, said blade being inclined across the axis of the body, a cutting portion of said blade extending below said body, and a heel portion behind said blade also projecting laterally from said body to cut the side of the well bore.

3. A bit for deflecting well bores including a body, means thereon to rigidly connect a drill stem thereto, a cutter blade carried by said body, said blade including portions extending laterally from opposite sides of said body to drill a full gage hole upon rotation of the bit, said blade being inclined across the axis of the body, a portion of said blade extending below said body, and a heel portion behind said blade also projecting laterally from said body to cut the side of said bore said blade having a substantially spade shaped configuration in full face side elevation.

4. A bit for deflecting well bores including a body, means thereon to rigidly connect a drill stem thereto, a cutter blade carried by said body, said blade including portions extending laterally from opposite sides of said body to drill a full gage hole upon rotation of the bit, said blade being inclined across the axis of the body, and a portion of said blade extending below said body, said blade having a substantially spade shaped configuration in full face side elevation, and a heel blade normal to said cutter blade and gradually merging with the under face of said cutter blade.

5. A bit for deflecting well bores including a body, means thereon to rigidly connect a drill stem thereto, a cutter blade carried by said body, said blade including portions extending laterally from opposite sides of said body to drill a full gage hole upon rotation of the bit, said blade being inclined across the axis of the body, and a portion of said blade extending below said body, said blade having a substantially spade shaped configuration in full face side elevation, and a scraper blade projecting downwardly and outwardly from said body above the face of said cutter blade.

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