

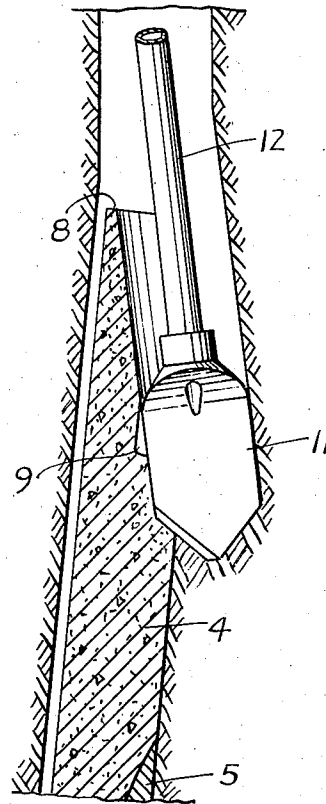
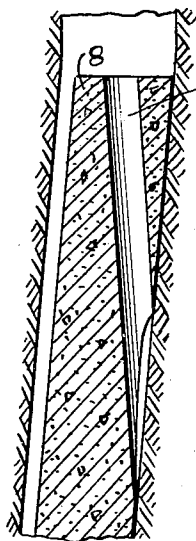
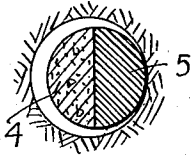
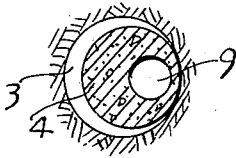
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WHIPSTOCK

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WHIPSTOCK

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7 Claims. (Cl. 255—1)

My invention relates to whipstocks for use in deflecting the well drill into a path different from that originally drilled, said deflection being performed at some point in the well and above the bottom thereof.

The invention is adapted for use particularly in straightening crooked holes and, in the drawing, is shown as being used for that purpose. It is to be understood however that this device is applicable to the structure of whipstocks no matter for what purpose they are employed.

It is an object of the present invention to provide a whipstock which is so constructed as to effectively deflect the bit in the direction desired and to do so in a particularly effective and reliable manner.

It is an object of the invention to provide a whipstock with an opening or recess in the upper end extended downwardly into the body of the whipstock at one side of the central axis of the whipstock body in such manner as to deflect the bit positively in one direction.

I desire to provide a whipstock which is capable of being easily cut by the drill cutter but which will serve to deflect the bit reliably in the direction desired.

In the drawing Fig. 1 is a central longitudinal section through a whipstock employing my invention, the same being located in the lower end of the well.

Fig. 2 is a broken section showing the manner in which the drill cutter is deflected by the whipstock.

Fig. 3 is a transverse section on the plane 3—3 of Fig. 1.

Fig. 4 is a similar transverse section on the plane 4—4 of Fig. 1.

Fig. 5 is a broken sectional view illustrating a slightly different embodiment of the invention.

In the drawing herewith I have shown a well bore 1, which has been deflected from the vertical at some point such as 2, the well bore 3 below this point being directed at an inclination from the vertical. Under such conditions it becomes desirable in straightening the hole to arrange the whipstock so as to deflect the bit in the proper direction to straighten the hole. It is the usual construction of whipstocks that the upper end thereof is cut on an inclined plane so that when the bit strikes the inclined portion of the whipstock it is deflected in the right direction. However, where the body of the whipstock is cut away by the drill cutter in the operation of cutting the side wall of the hole, it is found that the upper end of the whipstock is very often cut away so

as to leave a shoulder which prevents the proper deflection of the drill. To overcome this defect I abandon the idea of an inclined or wedgeshaped upper end to the whipstock.

In the drawing herewith I have shown the whipstock body 4 as being approximately cylindrical in shape and only slightly smaller than the diameter of the well bore. Said whipstock body is preferably made up of some comparatively light material such as cement or concrete with one side of the body toward the lower end weighted at 5 by a lateral section made up of lead or other heavy metal. The lower end of the cylindrical body is rounded at 6, and one side at 7 is beveled somewhat more strongly than at the other side so as to tend to position the whipstock in the well with the heavy portion 5 on what might be called the "down hill" side of the well bore. By the term "down hill" side I intend to designate the portion of the well bore which would be intersected by a projection of the vertical axis of the bore 1 downwardly.

By weighting one side of the lower end of the whipstock I obtain a sort of pendulum action, the heavier portion tending to rotate into a position against the "down hill" side of the well bore, as shown in Fig. 1.

The upper end of the whipstock may be flattened off, as shown at 8, and at one side of the central axis of the body of the whipstock I form a cavity or bore 9 directed downwardly into the body and on the side of the whipstock toward the weighted portion 5. Thus when the weighted portion bears against the "down-hill" portion of the well bore the cavity or bore 9 in the body of the whipstock will be on the "down-hill" side also.

When the whipstock is in position at the bottom of the well I contemplate anchoring the same in position by any desirable means and I have shown the same as embedded in a bond of cement 10 at the bottom of the hole, it being understood, of course, that other means may be employed. Such a bond of cement prevents the rotation of the whipstock when the side-tracking operation is being performed.

With the whipstock thus in position, a cutter, which may be of any desired type, such as a drill bit or reaming cutter 11, is lowered down at the end of the drill stem 12 and when brought into contact with the upper end of the whipstock the cutter is rotated.

The effect of the cavity 9 at one side of the center of the whipstock is to deflect the cutter in the direction toward the said cavity or bore. The greater amount of stock in the body at one

side of the bore 9 as compared with the thin wall on the other side will cause deflection toward the side where least resistance is encountered. The cutter will thus be deflected in the direction shown in Fig. 2 and the well bore will assume an angle to the portion of the well bore below the upper end of the whipstock, tending to straighten the well.

It will be obvious that the form of cutter employed may be varied and a bit, having a pilot cutter of small diameter to engage in said bore, may, if desired, be used.

I find that by this construction of the whipstock the cutter will tend to immediately cut away the upper end of the whipstock and instead of disintegrating the entire upper end thereof, as is sometimes done with the usual construction of whipstock, the cutter is immediately deflected toward the portion of least resistance, which is toward the side where the cavity 9 is located. The deflection will therefore be a smooth and even one toward the side of the cavity. I find that the amount of deflection toward the side where the cavity recess 9 is located may be controlled by the bore of said recess. Thus, if only a slight deflection is desired, a smaller cavity will be formed, while on the other hand if a large deflection is desired a larger bore will be formed in the upper end of the whipstock.

In Fig. 4, I have shown a slightly different embodiment of the invention in which the bore or recess 9a is extended from the central upper end of the whipstock in a direction inclined laterally toward the downhill side of the hole. It will be obvious that in this construction the bit will be more directly moved in the desired direction. When the recesses are made in this manner approximately the same results may be obtained as in the previously described embodiment.

This type of whipstock is simple and economically constructed and is found to be particularly reliable in its operation. While I have illustrated the same as being employed to straighten crooked holes, it will be obvious that it is adapted for ordinary side-tracking purposes where junk is encountered in the well or in any other position where a whipstock is to be used.

What I claim as new is:

1. A whipstock to be dropped freely to the bottom of a well including an approximately cylindrical body made up of frangible material to be cut away by the cutting tool, a plane upper

end thereon and a recess of uniform diameter extending longitudinally of said body from the upper end downwardly and at one side of the central axis of the body.

2. A whipstock to be dropped freely to the bottom of a well including an approximately cylindrical body made up of frangible material to be cut away by the cutting tool, and a recess extending longitudinally of said body from the upper end downwardly and at one side of the central axis of the body, to reduce the resistance to the drilling of said whipstock at one side thereof.

3. A whipstock including a cylindrical body of cementitious material having an eccentrically located longitudinal bore extending from the upper end downwardly to eliminate a portion of the material at one side of the axial center of said whipstock for the purpose described.

4. A whipstock including a cylindrical body made up of frangible material to be easily cut by the cutting tool, means to orient said whipstock in an inclined well bore, a longitudinal recess in the upper end of said body offset from the axis of said body on the downhill side of said well bore.

5. An elongated body of frangible material adapted to be inserted to the bottom of a well bore, to approximately fill the lower end of the well bore, and an elongated recess in said body extending from the upper end thereof downwardly at one side of the central axis of said body for a predetermined distance, and reducing the resistance to drilling at that side and thus deflect a drill bit.

6. A whipstock for wells including an elongated body of frangible material adapted to be set in a well bore, and means to orient said body relative to an inclined well bore, said body having an opening longitudinally thereof and extending from the center of the upper end thereof in an inclined direction downwardly therein.

7. A whipstock for wells including an elongated body of frangible material adapted to be set in a well bore, and means to orient said body relative to an inclined well bore, said body having an opening longitudinally thereof and extending from the center of the upper end thereof in an inclined direction downwardly therein, said opening being inclined toward the downhill side of said well bore.

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