The invention relates to a whipstock which is composed of cementitious material and which can be properly located in the well bore so as to cause deflection of the drill in the bore as the well is drilled.

It is one of the objects of the invention to provide a whipstock made of cementitious material which can be readily drilled away but which can be located in position in the well bore.

Another object of the invention is to provide a self-anchoring whipstock which can be landed in position and anchored so as to cause deflection of the bit in the desired direction.

Still another object of the invention is to provide a whipstock which will move readily through the well bore but which can be enlarged so as to anchor it against rotation at the desired elevation in the well.

Still another object of the invention is to provide a whipstock having a plurality of depressions in the upper surface thereof to receive the drill bit so that the bit will be deflected in the desired direction.

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

Fig. 1 is a side elevation with certain parts broken away and illustrating one form of a cement whipstock.

Fig. 2 is a top plan view of the whipstock showing the depression to effect deflection of the bit.

Fig. 3 is a side elevation with certain parts in section of another form of the whipstock in anchored position in the well bore.

Fig. 4 shows the Fig. 3 form of the whipstock before it has been anchored.

Fig. 5 is a section taken through the anchoring device of the invention.

Fig. 6 is a sectional view through the anchoring device but illustrating a modified form which will prevent rotation of the whipstock.

The whipstock includes a body portion 2, which in Fig. 1 is illustrated as comprising a lower guide and orienting portion 3 and the upper portion 4. These bodies are formed separately and as seen in Fig. 1 the guide portion 2 is preferably made of metal and will be of any desired diameter but is preferably formed with an inclined face 6 which extends across a major portion of the body and terminates in a rounded nose 7, which merges with the strength side 8 of the body. This inclined or beveled face 6 is so arranged that as the whipstock moves downwardly through the liquid in the well it will be acted upon by said liquid so the inclined portion of the well bore and said liquid will tend to turn the whipstock so that the beveled face 6 slides along the lower side 9 of the well bore where it is inclined so as to orient the whipstock. It is found by actual use that the conformation of the beveled end passing through the liquid in an inclined bore causes the whipstock to orient itself with the nose 7 toward the upper side of the bore. The upper portion of this body 2 is formed with a flat beveled face 10 which tapers to a thin edge at 11 which is the upper end of the guide or orienting portion of the body.

It will be observed from viewing Fig. 1 that the center of gravity of this guide portion 3 is to the right of the center line thereof and that if the whipstock is sliding along an inclined well bore that the whipstock will tend to take the position shown in Fig. 1, with the edge 13 of the guide portion against the lower side 9 of the well bore.

The upper portion 4 of the body is preferably made of cementitious material and cylindrical throughout its length except for the beveled face 15 on the lower side thereof. This beveled face 15 is arranged to engage with the beveled face 16 of the guide portion 3 and suitable shear pins or dowels 16 are arranged to project into both of the faces 10 and 15 so that the two bodies 3 and 4 will be maintained in alignment.

In Fig. 1 the pins or dowels 16 have been sheared and there has been a sliding action of the part 4 with respect to the part 3, and it will be observed that the portion of the dowels 16 in the body portion 4 have moved downwardly after they were sheared. It was the shearing of these dowels which permitted the setting of the whipstock in position, and it will be seen that the body portion 4 is now off-set laterally in the well bore relative to the guide portion 3. This sliding action tends to wedge the body portion 4 against one side of the well bore and the guide or orienting portion 3 against the opposite side of the well bore, so that the whipstock is lodged firmly in position.

The body portion 4 is made of cementitious material of any suitable nature so that it may be readily drilled away by the drill bit such as 20. To facilitate the starting of this drilling operation the upper end 21 of the whipstock is formed with a plurality of depressions 22. These depressions 22 are best seen in Fig. 2 and as illustrated are four in number. When the whipstock is properly oriented by virtue of the weighted portion 3 then one of the depressions 22 will be on the lower side of the hole so that when the pilot portion 24 of the
bit 20 is lowered into the well it will engage in one of these depressions to start the drilling operation in alignment with the vertical portion 25 of the well bore and diverston previously started will in this manner be avoided.

In this manner one corner of the upper end of the whipstock will be drilled away and as seen in Fig. 1 the well bore will continue in a vertical direction and the diversion previously started will in this manner be avoided.

The upper body portion 32 is also formed of cementitious material and is formed with oppositely tapered beveled faces 31 and 32 on the upper end thereof.

As seen in Fig. 3 the jaw 35 has moved outwardly to engage the face 38 of the well bore. A similar jaw 33 is provided on the opposite side between the two body members and is similarly attached.

When the device is lowered into the well bore the guide portion 30 will contact either the bottom of the well bore or a suitable obstruction which has been positioned in the well at the desired elevation so that the further movement thereof is restrained. When this occurs the pin 41 will be sheared and the body portion 32 will continue its movement to assume the position shown in Fig. 3. This moves the jaws 35 and 32 outwardly to anchor the whipstock firmly in position. The upper end of this whipstock in the Fig. 3 form also carries the depressions 22 to direct the pilot bit 24 in the desired direction.

Fig. 6 shows a slightly modified form of the invention wherein one of the anchoring jaws such as 45 is shown as having circumferential teeth thereon which anchor the dog against vertical movement. The opposite jaw 41, however, may have vertical teeth 46 thereon so as to anchor it against the well bore against rotation. When

the whipstock is equipped with jaws of this type it seems obvious that it will be anchored against both vertical and rotational movement.

It is to be understood that the whipstock may be dropped into the well bore and fall by gravity to the position shown in either Fig. 1 or Fig. 3, or it may be lowered by any suitable device.

What is claimed is:

1. Whipstock for wells comprising a body of friable material which may be drilled away, a plurality of deflecting recesses in its upper end, anchor means on said body to lodge the whipstock in a well bore, and releasable means whereby said anchor is held inoperative.

2. A whipstock made up of top and bottom portions, a wedge shaped end on each of said portions, anchor members disposed between said ends, a dovetailed slidable connection between said portions and said members, and arranged to move radially outward when said portions move toward each other.

3. A whipstock made up of top and bottom portions, a wedge shaped end on each of said portions, anchor members disposed between said ends, means on said ends interengaging slidably with said members to hold said members in place, and arranged to move radially outward when said portions move toward each other.

4. A whipstock including a guide portion, a wedge shaped upper end thereon, a body portion, a lower wedge shaped end thereon, and releasable means connecting said portions and spaced said ends apart, well bore engaging members disposed between said portions slidably interengaged with said wedge shaped ends, and adapted to be moved outwardly upon release of said means by said wedge shaped ends, said portions being formed of friable material.

5. A whipstock comprising a cylindrical body of cementitious material adapted to be dropped into the well and which is free to rotate, the lower end of which is tapered to one side of the axial center of said body, the forward end being streamlined, and a deflecting surface at the upper end of said body, having a plurality of shallow deflecting recesses into which a drill may engage to cut said whipstock and be deflected from the axial direction of the bore hole.

6. A whipstock of friable material which may be easily cut by a drill, means to anchor said whipstock in a well, said whipstock having its upper end cut on a diametrical plane and with a plurality of shallow radially extending deflecting notches therein, whereby a drill may engage one of said notches and cut said whipstock in an inclined direction.

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