W. I. BETTIS.

SAMPLING DEVICE FOR ARTESIAN WELLS.

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1,023,918. Patented Apr. 23, 1912.

Fig. 1.

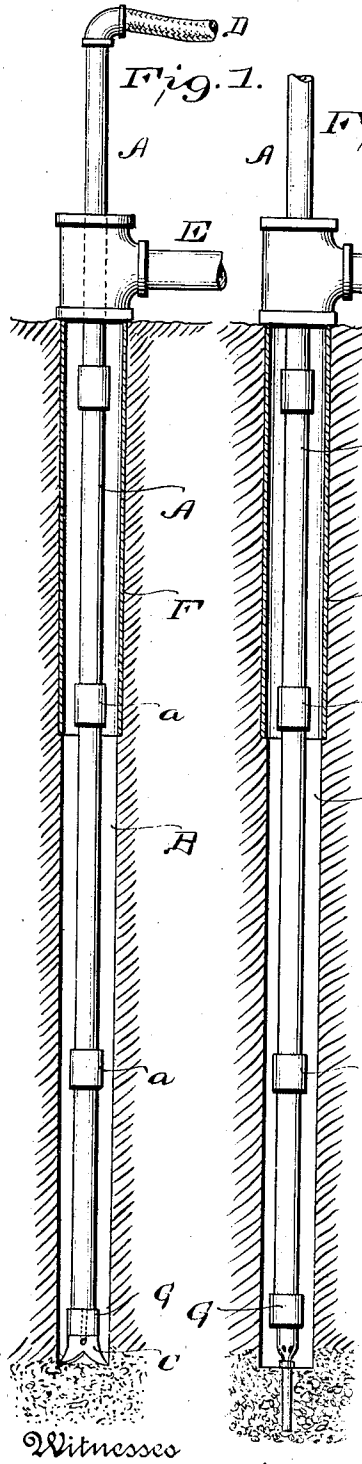


Fig. 2.

Fig. 3.

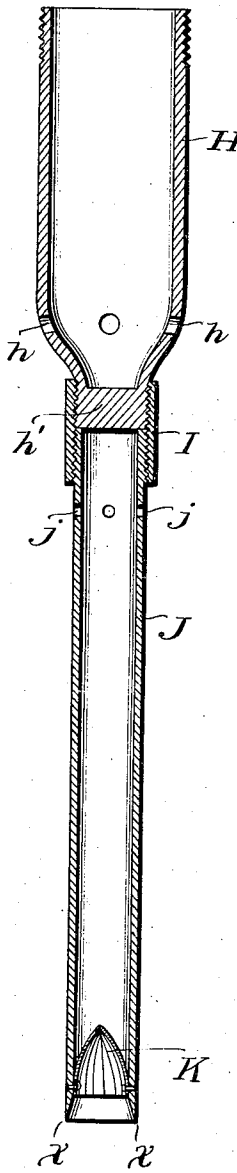
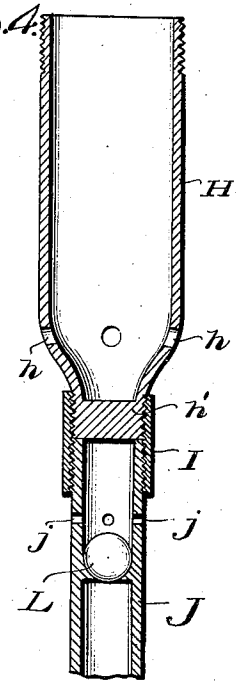


Fig. 4.



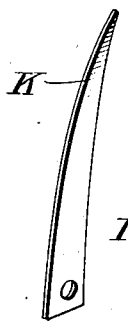


Fig. 6.

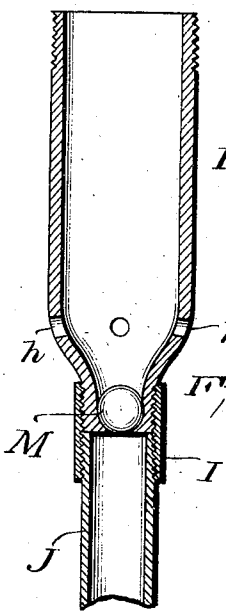


Fig. 5.

Witnesses
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SAMPLING DEVICE FOR ARTESIAN WELLS.

1,023,918. Specification of Letters Patent. Patented Apr. 23, 1912.

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To all whom it may concern:

Be it known that I, WILLIAM I. BETTIS, a citizen of the United States, residing in Houston, in the county of Harris and State of Texas, have invented certain new and useful Improvements in Sampling Devices for Artesian Wells, of which the following is a specification.

One of the most common ways of forming oil wells is to drill a hole vertically in the ground by means of a drill or cutting tool detachably connected with the lower end of a pipe section which is rotated as it descends and to which other sections are added as the depth of the well increases. Water, or water and mud known as "slush," is forced down through the pipe emerging at the lower end thereof through the cutter and rising with the cuttings to the top of the ground where it is carried off. Of course it is desirable to stop the drilling operation when oil is reached and no reliable means, so far as I am aware, has heretofore been devised for this purpose. Usually the water, mud and sand as they emerge from the well are examined to obtain this information, but as sometimes the well is very deep, two thousand feet or more, it will be readily understood that this practice is not always reliable. Often the oil sands are passed by and the drilling continued through unproductive strata.

According to my invention I provide a sampling device which is connected to the lower end of the drill pipe after the well has been sunk to some extent and when the behavior of the apparatus or the appearance of the emerging slush indicates a possibility of success. This device is so constructed that it may be readily attached to the drill pipe by the same collar that is used to connect the drilling tool to the pipe and it replaces the tool during the sampling operation.

The device comprises a tubular upper part threaded to connect with the drill collar and which opens into the drill pipe and a lower tubular part which receives the sample. The upper part is separated from the lower part either by a plug, partition or valve but has one or more openings in its side which provide a communication between the interior of the drill pipe and the surrounding well. The lower part of the device is formed at its lower end with a cutting edge to enable it to easily penetrate the earth and it has one or more openings at its upper end to permit water or slush to pass out through it. Preferably devices, such as spring fingers, are arranged at the lower end of the sampling tube to assist in holding the sample in place when being withdrawn from the well.

In the accompanying drawings, Figure 1 shows a side elevation of a well-drilling apparatus of ordinary construction and also illustrates a well formed by such apparatus, the drilling tool being attached. Fig. 2 is a similar view with the drilling tool replaced by my sampling device. Fig. 3 shows a vertical central section on an enlarged scale of a sampling device constructed in accordance with my invention. Fig. 4 is a similar view of a part of the sampling device embodying a modified form of my invention. Fig. 5 shows a further modification. Fig. 6 is a perspective view of one of the spring fingers shown in Fig. 3.

In Fig. 1 I have shown a well-drilling apparatus of well known construction. A indicates the drill pipe made in sections, as usual, connected by collars *a*. B indicates the hole or well surrounding the drill pipe. C indicates the drilling tool. Water or slush applied by the hose D is forced into and down through the drill pipe and the water or slush which rises in the well is carried off through the pipe E. F indicates a casing, such as is usually employed, near the top of the well. G indicates the collar which detachably connects the drill tool with the drill pipe. This apparatus is operated in the usual way to form the well and when it is desired to take a sample of the earth at the bottom of the well, the drill pipe is withdrawn and the drill tool removed and replaced by my sampling device, several forms of which are shown in Figs. 3, 4, and 5.

The preferred construction is shown in Fig. 3 and the device there illustrated comprises an upper part or section H which is tubular and is formed with a threaded upper end adapted to be connected with the lower end of the drill pipe by means of the drill collar G. Near its lower end the part H is formed with one or more lateral openings *h* which are for the purpose of allowing water or slush to enter the drill pipe when the latter is descending and permit the water or slush to pass out from the pipe

when the latter is being raised. In this way the level of the liquid in the well is not materially disturbed. This is of importance as the column of liquid serves to maintain the walls of the well, prevent them from collapsing and also holds down gas pressure. The lower end of the part H shown in Fig. 3 is closed at h' and it is threaded to receive a collar I which connects it with the upper threaded end of the sampling tube or barrel J, the lower end of which is formed or provided with a cutting edge x. Near its upper end the tube J is provided with one or more openings j to allow the liquid which fills it while being lowered to pass out and give way to the solid material which it receives when it is forced into the ground below the bottom of the well previously drilled, as shown in Fig. 2, thus obtaining a sample not mixed with mud.

I have found in actual practice that samples of sand can be obtained at any desired depth by the device thus far described, but in order to assist in holding the sample in place I may employ spring fingers K constructed and arranged as shown in Figs. 3 and 6.

In Fig. 4 I have shown a modification in which a valve L is arranged in the tube J below the openings j to prevent liquid which might enter the tube through the openings j from pressing on the top of the sample.

In Fig. 5 a further modification is shown in which the top of the sampling tube is made to communicate with the bottom of the section H instead of with the surrounding well. In this case a valve M opening upward is interposed between the parts H and J. This device is the same in principle as that shown in Fig. 3. When it is lowered in the well water or slush enters through the holes h and fills the line of drill pipes, while the liquid also fills the sampling tube. When, however, the sampling tube is driven into the ground in the manner indicated in Fig. 2, the liquid in the tube is displaced by the sand or earth, the valve M rising to allow the liquid to pass out to the well or to the section H. When the sample is raised with the pipe line the liquid flows out from the pipes through the holes h and no liquid can pass into the sampling tube from above.

While this sampling device is especially intended for use in drilling oil wells, it may be employed in drilling other kinds of wells, or in taking samples in various well-making or mining operations.

I claim as my invention:—

1. A sampler for Artesian and other wells, comprising an upper tubular section adapted to be connected to the lower end of a drill pipe and having one or more lateral openings to connect with the well, and a lower section or sampling tube having a lower cutting edge and an opening at the top for the passage of liquid outwardly from the sampling tube as the sample rises in the tube.

2. The combination with a drill pipe, of a sampling device, comprising an upper tubular section attached to the bottom of the drill pipe and having one or more lateral openings for the passage of liquid into and out of the pipe, and a lower section or sampling tube connected with said upper section having a lower cutting edge and one or more lateral openings at the top communicating with the well.

3. A sampler for Artesian and other wells, comprising an upper tubular section adapted to be connected to the lower end of a drill pipe and having one or more lateral openings to connect with the well, and a lower section or sampling tube having a lower cutting edge and one or more openings at the top for the passage of liquid outwardly as the sample rises in the tube, and devices at the lower end of the sampling tube for assisting in holding the sample in the tube.

4. A sampling device for wells, comprising an upper tubular section adapted to be connected to the lower end of the drill pipe and having one or more lateral openings to connect with a well and a lower section or sampling tube having a lower cutting edge and one or more openings at the top for the passage of liquid outwardly as the sample rises in the tube, and a valve in the upper part of said sampling tube for preventing the passage of liquid downwardly into the tube.

In testimony whereof, I have hereunto subscribed by name.

WILLIAM I. BETTIS.

Witnesses:

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