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WELL POINT

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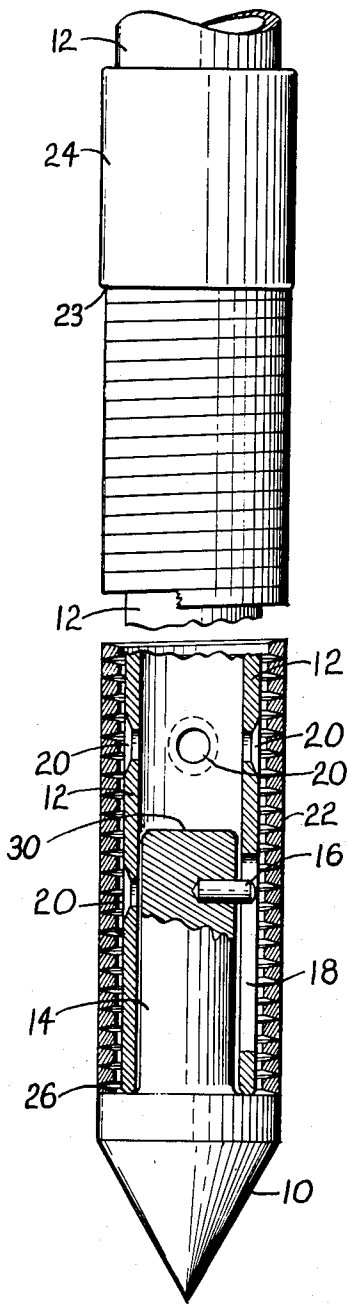


FIG. 1

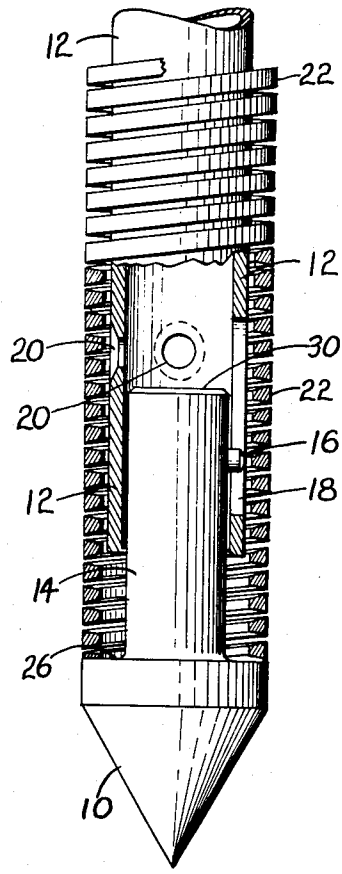


FIG. 2

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WELL POINT

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This invention relates to a well point for use in drilling and obtaining water, oil or other fluids, but is not necessarily so limited.

It is an object of this invention to provide a well point which does not permit clogging of its openings during the drilling process.

Another object of this invention is to provide a well point which has a filter element with openings adjustable in size.

Another object of this invention is to provide a well point which does not easily clog while fluids are obtained through it from the ground.

A further object of this invention is to provide a well point, the filter of which cannot easily be contaminated.

A further object of this invention is to provide a well point, the filter of which may be easily cleaned, if any degree of clogging exists.

Still another object of this invention is to provide a filter which may be constructed to withstand usage throughout a long period of time without breaking or becoming damaged.

Other objects and advantages reside in the construction of parts, the combination thereof and the mode of operation, as will become more apparent from the following description.

In the drawings, Figure 1 is a longitudinal view of the well point with a portion of the well point device shown in sectional view. Figure 1 shows the well point device as it is used during the drilling process.

Figure 2 is a fragmentary, longitudinal view with a portion of the device shown in sectional view. Figure 2 shows the relative position of the components of the well point device after they have been adjusted in the ground for obtaining fluids through it.

Referring in detail to the drawings, a point 10 is slidably attached to a pipe section 12 by means of a shank 14 and a pin 16. The shank 14 is inserted into the end of the pipe section 12. A portion of the pin 16 is firmly attached in the shank 14. The other end of the pin 16 is loosely fitted into a vertical slot 18 which terminates in the pipe section 12.

A plurality of orifices 20 are cut through the wall of the pipe section 12 through which fluids may flow if the orifices 20 are uncovered by the turns of a helical spring 22. The helical spring 22 closely encircles the pipe section 12. Figure 1 shows the spring 22 tightly compressed between a shoulder 23 of a collar 24 and a shoulder 26 of the point 10. The collar 24, which may consist of an ordinary pipe coupling, is fixedly attached to the pipe section 12. It may also be observed in Figure 1 that the shoulder 26 of point 10 is in contact with the lower end of the pipe section 12.

The position of the components, as shown in Figure 1, is that position which is maintained during the drilling process. The spring 22 is so tightly compressed that there is no space between the turns of it to allow entrance of dust, dirt, sand, gravel, or other foreign material to the orifices 20 as the well point device is forced into the ground with the point 10 cutting an entrance through the ground. The act of forcing the well point device through the ground causes the shoulder 26 of the point 10 to lie firmly against the lower end of the pipe section

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12. The spring 22 is of such length that when the shoulder 26 of the point 10 abuts the lower end of the pipe section 12, the spring 20 will be entirely compressed. The orifices 20 are then entirely closed by the spring

22. When the proper depth for the well point device has been reached, it is desired to open the orifices 20 to allow a flow of fluid through them. The orifices 20 can be opened by forcing only the point 10 farther into the ground. This can be accomplished by driving on the end surface 30 of the shank 14 by any suitable means extending downwardly through the pipe section 12. This causes the point 10 to move farther into the ground while the other components of the well point device remain at the prepositioned depth. As the point 10 moves farther downward with respect to the other components, the shoulder 26 moves away from the lower end of the pipe section 12. This movement allows expansion of the spring 22, due to the fact that spring 22 is constantly in compression and remains firmly against the shoulder 26 of the point 10 and the shoulder 23 of the collar 24 throughout the allowable movement of the point 10. The downward movement of the point 10 is limited by the lower end of the slot 18 which guides the movement of the pin 16.

Often the well point device is used in very hard soils which may retain the spring member so tightly that it will not expand as the point 10 and the collar 24 are further separated. When used in such hard ground, the spring 26 is fixedly attached to the point 10 and to the collar 24. Thereby the spring is forced to expand as the distance between the point 10 and the collar 24 is increased.

Another method of obtaining expansion of the spring 22 is that of partially withdrawing from the ground the pipe section 12 including the collar 24. The point 10 then remains at the prepositioned depth. The increased distance between the shoulder 23 of the collar 24 and the shoulder 26 of the point 10 allows expansion of the spring 22. The spring 22 may also be expanded by forcing fluid downwardly in the pipe section 12. This causes downward movement of the point 10, thus increasing the distance between the point 10 and the collar 24, which allows expansion of the spring 22. It may be seen that this procedure also provides an excellent cleaning action, in that it serves to move the spring 22 at the time when fluid is flowing in reverse direction through the turns of the spring 22.

As shown in Figure 2, the expansion of the spring 22 allows space between each turn of the spring 22. When space exists between the turns of the spring 22, the orifices 20 are partially uncovered. This makes it possible for fluids to flow through the orifices 20 and upwardly through the pipe section 12. The extent to which the orifices are uncovered depends upon the permitted expansion of the spring 22. A very high degree of accuracy and control may be maintained in the opening between turns of the spring 22 by expansion. Each movement of the point 10 beyond the lower end of the pipe section 12 must be divided by the number of turns of the spring 22 to determine the change in distance between each turn of the spring 22. In other words, each small increment of movement of the point 10 means that the distance between each turn has changed the amount of the increment divided by the number of turns of the spring 22.

The expansion of the spring 22 may be adjusted with slight openings between turns in sandy locations, while the spring 22 may be expanded further to allow more space between turns in gravel or in rocky locations. The spring 22 can be easily and accurately adjusted as desired.

The preferred embodiment shows the spring 22 of trapezoidal cross section.

The spring 22 also acts as a filter or screen over the orifices 20. This results in a filter which cannot easily become contaminated or clogged. The opening between each turn is a lengthy helical opening. These openings tend to cause foreign material to move away from the orifices 20 and not remain over these orifices.

The orifices 20 cannot become clogged during the drilling process due to the fact that they are completely covered by the spring 22. The orifices 20 will not easily clog while fluids are flowing from the ground through the orifices 20. This is attributed to filtering action of the spring 22 and the shape of the openings between turns of the spring 22.

The components of the well point device are of a type which may be so constructed that they may withstand long term use without deterioration or damage. This well point device readily lends itself to usage in any type of soil or ground.

Although the device has been described as consisting of a coil surrounding a pipe provided with apertures, any other suitable structure may be used instead of the pipe for holding the convolutions of the coil properly aligned during the drilling operation.

Although the preferred embodiment of the device has been described, it will be understood that within the purview of this invention various changes may be made in the form, details, proportion and arrangement of parts, the combination thereof and mode of operation, which generally stated consist in a device capable of carrying out the objects set forth, as disclosed and defined in the appended claims.

Having thus described my invention, I claim:

1. In a well point device having a conical point with a shank of smaller cross section than the largest part of the conical point thereby forming a shoulder between the shank and the conical point, a pipe section having a plurality of orifices and a slot formed in the wall of the pipe section, the shank being slidably positioned in one end of the pipe section, a pin fixedly attached in the shank of the conical point, the pin extending from the shank into the slot formed in the wall of the pipe section, the pin being slidably movable within the slot, a collar fixedly attached around the pipe section at a position on the pipe section at a distance from the orifices, and a helical spring encircling the pipe section, one end of the helical spring abutting the collar and the other end of the helical spring abutting the shoulder of the conical point, the spring being compressible to close the orifices and expandable to open the orifices to any desired degree, the spring also acting as a filter of the fluids flowing through the orifices.

2. In a well point device having a pipe section provided with a plurality of orifices and a longitudinal slot formed in the wall of the pipe section, the longitudinal slot having both ends thereof terminating in the pipe section, a conical point including a shank of smaller cross section than the greatest cross section of the conical point thereby forming a shoulder between the conical point and the shank, the shank being slidably positioned in the pipe section, a pin at a right angle to the longitudinal axis of the shank, the pin extending into the shank and into the slot, the pin being slidably movable in the slot thereby limiting the movement of the conical point with respect to the pipe section, a collar around the pipe section fixedly attached to the pipe section at a location spaced from the orifices, a helical spring closely encircling the pipe section and disposed over the orifices thereof, the helical spring abuttingly engaging the shoulder of the conical point and the collar and being compressed therebetween, the amount of compression of the helical spring depending upon the position of the shoulder of the conical point relative to the collar, the helical spring acting as a closure and a filter over the orifices, the degree of closure depending upon the compression of the helical spring.

3. In a well point device comprising a pipe section, said pipe section having an orifice and a slot formed in the wall thereof, a relatively short collar encircling the pipe section and attached thereto, a helical spring encircling the pipe section adjacent the orifice, a conical point including a shank forming a shoulder and slidably positioned in one end of the pipe section, and a pin attached to the shank and slidably movable in the slot of the wall of the pipe, the helical spring being compressed between the collar and the shoulder of the conical point, the degree of compression depending upon the position of the shoulder of the conical point with respect to the collar, the helical spring acting as a closure and a filter over the orifice, the degree of closure and the degree of filtering depending upon the compression of the helical spring.

4. In a well point device comprising a pipe section, said pipe section having a plurality of orifices formed through the wall of the pipe section, a conical point adjustably attached to one end of said pipe section, said conical point having a shoulder, a collar attached to the outer surface of the pipe section in spaced relation from the end thereof to which the conical point is attached, and a helical spring encircling the pipe section and compressed between the collar and the shoulder of the conical point, the degree of compression of the helical spring depending upon the distance between the shoulder of the conical point and the collar, the helical spring acting as a closure and as a filter over the orifices in the wall of the pipe section, the degree of closure and filtering action depending upon the compression of the helical spring.

5. In a well point device including a conduit section having an orifice therein, a conical point movably attached to the conduit section, the conical point having an abutment shoulder, the conduit section having a collar attached thereto, and a resilient helical member engaging the shoulder of the conical point and the collar of the conduit section, the helical member encircling the conduit section adjacent the orifice and being adapted to cover the orifice.

6. In a well point assembly comprising a conduit member provided with an external abutment surface and having an orifice therein, a point member movably attached to the conduit, and a helical resilient spring member compressed between the point member and the abutment surface adjacent the orifice, the conduit member also serving as means for adjusting the compression of the helical spring member.

7. In a well point assembly including a conduit member and a point member movably attached one to the other, the conduit member having a fluid port therein, each of the members being provided with an abutment surface, and a resilient helical member encircling the conduit member adjacent the fluid port, the helical member being compressed between the abutment surfaces having one end thereof in engagement with the abutment surface of the conduit member and the other end thereof in engagement with the abutment surface of the point member, the interstices between the convolutions of the helical member being openable and closable by movement of the conduit member with respect to the point member, the helical member acting as a closure and filter means for the fluid port of the conduit member, the degree of closure and filtering by the helical member depending upon the movement of the conduit member with respect to the point member.

References Cited in the file of this patent

UNITED STATES PATENTS

Re. 4,267	Duck	Feb. 21, 1871
77,772	Skilling	May 12, 1868
408,487	Jewell	Aug. 6, 1889
1,211,415	Cross	Jan. 9, 1917
1,638,731	Hansom	Aug. 9, 1927
1,983,428	Zeidler, Jr.	Dec. 4, 1934
2,280,054	Beck	Apr. 21, 1942