March 15, 1932. J. D. BRACK 1,849,168

BACK PRESSURE VALVE

Filed May 9, 1931

Fig. 1.

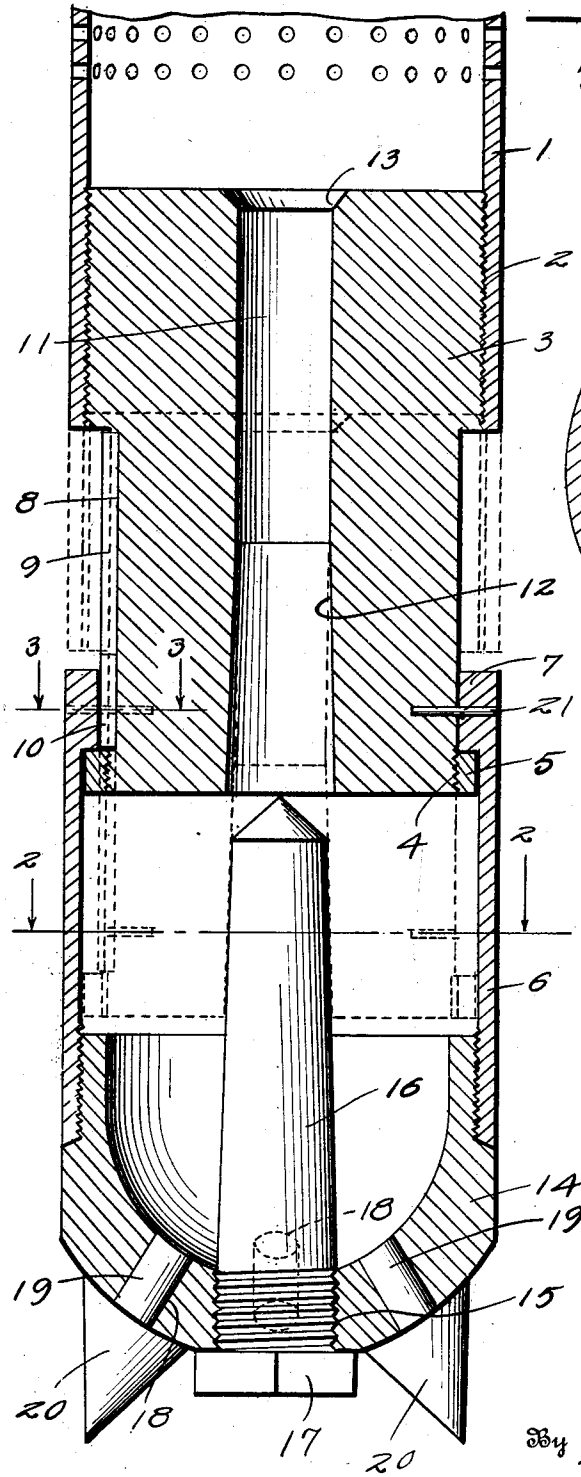


Fig. 2.

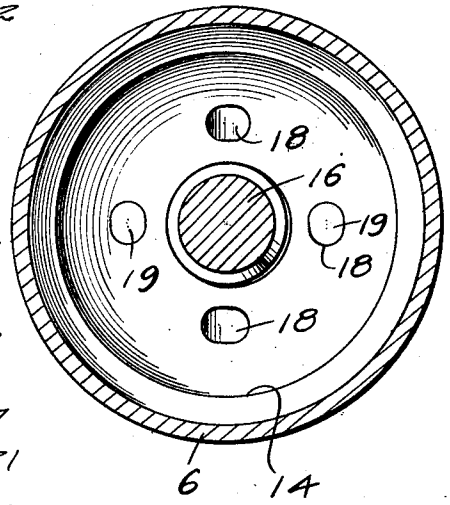
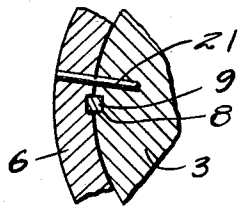


Fig. 3.



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Patented Mar. 15, 1932 1,849,168

UNITED STATES PATENT OFFICE

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BACK PRESSURE VALVE

Application filed May 9, 1931. Serial No. 536,251.

This invention relates to improvements in back pressure valves for use in the sinking of wells.

The primary object of the invention is to provide a back pressure valve which will remain open while the drill stem and screen are being lowered into the well and which can be closed at the bottom of the well hole by the weight of the drill stem.

A further object of the invention is to provide a back pressure valve which, after being closed, will remain tight and prevent the passage of sand or other matter up into the drill stem.

A still further object of the invention is to provide a back pressure valve which may be readily opened by the pressure exerted thereagainst by the water from the nozzle of a wash pipe.

The invention will be best understood from a consideration of the following detailed description taken in connection with the accompanying drawings forming a part of the present invention with the understanding, however, that the invention is not confined to any strict conformity with the showing of the drawings but may be changed or modified so long as such changes or modifications mark no material departure from the salient features of the invention as expressed in the appended claims.

In the drawings:—

Figure 1 is a view in longitudinal section of the structure embodying the present invention showing the same in the condition in which it is lowered into the well hole and applied to the lower end of a drill stem;

Figure 2 is a sectional view taken on the line 2—2 of Figure 1;

Figure 3 is a sectional view taken on the line 3—3 of Figure 1.

Referring now more particularly to the drawings wherein like numerals of reference indicate corresponding parts throughout the several views, the numeral 1 indicates the lower end of a drill stem, the part here shown being a portion of a screen which is interiorly threaded, as indicated at 2, for the attachment of the back pressure valve thereto.

The back pressure valve comprises an elongated body 3 having a threaded enlarged upper portion which engages in the lower end of the drill stem, as illustrated. The lower end of the body 3 is threaded through a portion of its length, as indicated at 4, to receive thereon a ring collar 5.

The lower portion of the body 3 extends into a sleeve 6, the upper end of which is of reduced diameter to form a movement limiting flange 7 which works longitudinally upon the reduced lower portion of the body between the ring 5 and the shoulder formed adjacent the transverse center thereof by the enlarged upper end. The wall of the reduced portion of the body has a key-way 8 formed therein, in which is positioned the key 9, this key working in a slot 10 which is formed in and transversely of the flange 7.

Formed longitudinally through the body 3 is a bore 11, the lower portion of which is tapered as at 12, the lower end being of greater diameter than the main portion of the passage, as illustrated. The upper end of the passage 11 is reamed out as indicated at 13 to form a seat for the nozzle of the wash pipe.

The lower end of the sleeve 6 is threaded over a reduced extension of a head 14, the lower end of the head being rounded or substantially semi-spherical as shown. The central portion of the head 14 is provided with a threaded passage 15 in which is engaged a pin 16. This pin is tapered in conformity with the taper of the lower portion 12 of the bore 11 and at its outer end it has formed integral therewith the head 17 by means of which it may be grasped to be threaded into or from position.

Disposed about the central threaded passage 15 in which the tapered pin 16 is secured are apertures 18. Certain of these apertures

receive the shanks 19 of anchor points 20, while the other apertures provide passages for the escape of water which is injected into the head from the wash pipe.

The upper end of the sleeve 6 and the lower end of the body 3 are provided with suitable apertures in which may be extended shear pins 21. These pins are in position when the stem is being lowered into the well so that contact of the head with the wall of the well hole will not cause the head and sleeve to shift and close the valve. After the usual operations have been performed the valve is closed by allowing the weight of the drill stem to be placed upon the pins 21. This will cause the pins to be sheared off and will thus allow the body 3 to move downwardly onto the pin 16. The pin will thus wedge tightly into the tapered lower part of the bore 11 and close the same.

The anchoring points 20 are provided to hold the valve structure against turning when backing off the setting tool and the key 9 between the body and the sleeve 6 also holds these parts against relative rotative movement during this operation.

Having thus described my invention, what I claim is:—

1. A back pressure valve of the character described comprising a body having a tapered bore therein, said body being designed to be attached to the lower end of a drill stem, a sleeve slidably receiving a portion of said body, a plug carried by said sleeve for insertion into said tapered bore, and means connecting the sleeve with the body for normally holding the sleeve and body against relative movement.

2. A back pressure valve comprising an elongated body designed to have one end attached to the lower end of a drill stem and having a bore therethrough, said bore being tapered at its lower end, a sleeve having the lower end of the body extending thereinto and slidably receiving the same, means coupling the sleeve and body together to prevent the complete separation thereof, an apertured head carried by the lower end of said sleeve, and a tapered plug carried by the head and disposed vertically in the sleeve in a position to be inserted into said bore when the body is lowered into the sleeve.

3. A back pressure valve comprising an elongated body designed to have one end attached to the lower end of a drill stem and having a bore therethrough, said bore being tapered at its lower end, a sleeve having the lower end of the body extending thereinto and slidably receiving the same, means coupling the sleeve and body together to prevent the complete separation thereof, an apertured head carried by the lower end of said sleeve, a tapered plug carried by the head and disposed vertically in the sleeve in a position to be inserted into said bore when the body is lowered into the sleeve, and a shear pin connecting the sleeve with the body to maintain the same against relative movement.

4. A back pressure valve comprising an elongated body having a bore longitudinally therethrough and tapered at one end, said body at its upper end being of enlarged diameter and designed for threaded engagement with the lower end of the drill stem, a sleeve receiving the lower end of the body therein and having a flange about the interior thereof having sliding contact with the body, a ring removably positioned on the lower end of the body for engagement by said flange to limit the movement of the sleeve thereon, a head removably positioned in the lower end of the sleeve and having water outlet passages therethrough, a tapered plug threadably engaged in said head and disposed vertically in the sleeve in alignment with the bore and means for normally maintaining the sleeve and body against relative movement during the insertion of the drill stem and valve into a well hole.

5. A back pressure valve comprising an elongated body having a bore longitudinally therethrough and tapered at one end, said body at its upper end being of enlarged diameter and designed for threaded engagement with the lower end of the drill stem, a sleeve receiving the lower end of the body therein and having a flange about the interior thereof having sliding contact with the body, a ring removably positioned on the lower end of the body for engagement by said flange to limit the movement of the sleeve thereon, a head removably positioned in the lower end of the sleeve and having water outlet passages therethrough, a tapered plug threadably engaged in said head and disposed vertically in the sleeve in alignment with the bore, means for normally maintaining the sleeve and body against relative longitudinal movement during the insertion of the drill stem and valve into a well hole, means for preventing relative rotary movement between the body and sleeve, and means carried by the head for engaging in the bottom of the well hole to prevent the turning of the valve and stem.

6. A back pressure valve comprising an elongated body having a bore longitudinally therethrough and tapered at one end, said body at its upper end being of enlarged diameter and designed for threaded engagement with the lower end of the drill stem, a sleeve receiving the lower end of the body therein and having a flange about the interior thereof having sliding contact with the body, a ring removably positioned on the lower end of the body for engagement by said flange to limit the movement of the sleeve thereon, a head removably positioned in the lower end of the sleeve and having water

outlet passages therethrough, a tapered plug threadably engaged in said head and disposed vertically in the sleeve in alignment with the bore, means for normally maintaining the sleeve and body against relative longitudinal movement during the insertion of the drill stem and valve into a well hole, means for preventing relative rotary movement between the body and sleeve, and pointed members carried by and projecting from said head for engaging the bottom of a well hole to prevent the turning of the stem and the valve.

In testimony whereof I hereunto affix my signature.

JOHN D. BRACK.