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TUBING BOTTOM

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FIG. 1.

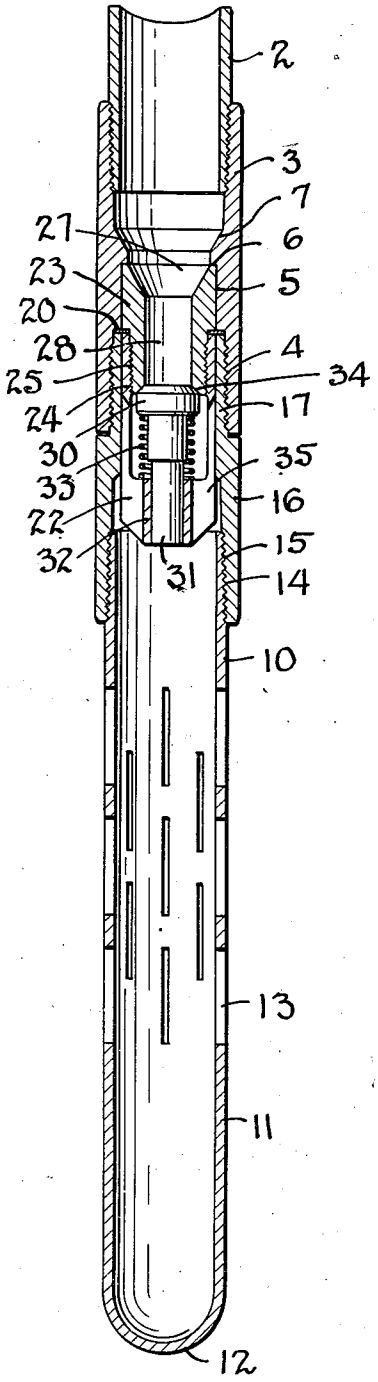
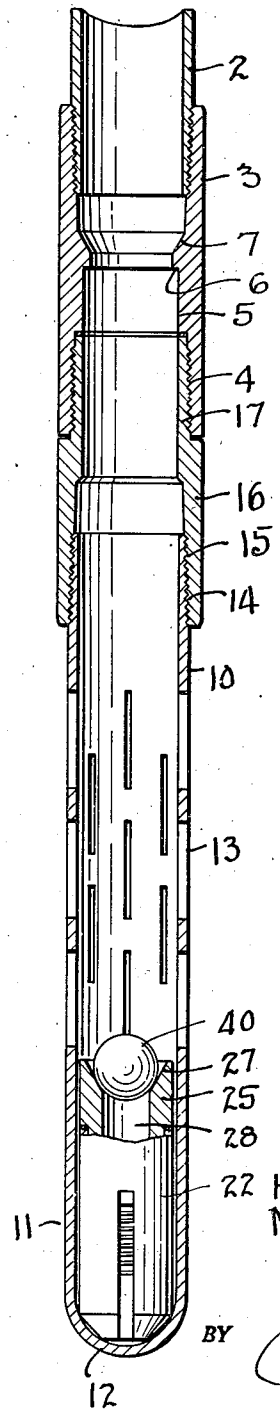


FIG. 2.



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TUBING BOTTOM

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7 Claims. (Cl. 166—4)

The invention relates to a tubing bottom which is to be attached to the lower end of the tubing in completing wells.

In many instances it is desirable to force the tubing into the well where pressure is being encountered and to insure that the tubing is clear of mud and foreign matter at the time it is landed in position.

The present invention contemplates that the tubing will be closed with a back pressure valve. Back pressure valves for well bottoms are well known but in most instances these valves have been utilized at different locations for closing the strainer as distinguished from closing the tubing, and are made a permanent part of the well bottom assembly. Some of them are manipulated by turning or other movement of the tubing. With the present tubing valve it is intended that the valve will remain closed while the tubing is being run and will be opened by the pressure of the liquid from within the tubing when the well is being washed, but after the well has been completed and the tubing properly set then the back pressure valve must be removed in order to open the tubing for production. The valve is therefore so arranged that it will close the tubing against pressure from without while the tubing is being lowered but is capable of opening due to pressure from within the tubing, and a means can then be applied for closing the valve against pressure from within so that this pressure may be utilized to remove the valve.

An object of the invention is to provide a removable back pressure valve for tubing bottoms.

Another object of the invention is to provide a back pressure valve which can be used to float a tubing into place which will open to allow washing of the well but which can thereafter be removed when the well is to produce.

Another object of the invention is to hold a tubing back pressure valve in position by a shear means.

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

Fig. 1 is a vertical sectional view of the tubing with the back pressure valve in position.

Fig. 2 is a vertical sectional view similar to Fig. 1 but showing the back pressure valve as having been removed.

In the drawing the tubing is indicated generally at 2 and may be of the desired length to extend into the well bore. A coupling 3 is threaded to the lower end of the tubing and has a box member 4 extending downwardly thereon. This coupling is of special construction with a recess 5 therein which is defined by the shoulder 6. A tapered area 7 merges the larger diameter of the coupling with the reduced diameter due to the shoulder 7.

The tubing bottom is in the form of a foot piece or tail pipe 10. This pipe comprises a short section 11 which is closed at the lower end 12 and has perforations 13 therein to admit the fluid to be produced from the well and to allow for the discharge of the washing liquid when the well is being washed. This pipe is threaded at 14 to be engaged in the box member 15 of the coupling 16. This coupling has a pin member 17 which engages in the box member 4 of the coupling 3.

A shear plate 20 of an annular configuration is shown as having been clamped in the box member 4 by the pin member 17 and is of a shape to extend outwardly into the recess 5.

A valve assembly 22 has been shown as disposed within the couplings 3 and 16 of the tubing bottom and is made up of a head 23 and skirt 24. The head and skirt are threaded together at 25 so that the shear plate 20 is clamped between them. Such an arrangement, of course, holds the valve assembly 22 in position in the recess 5 with the upper end of the head 23 engaged adjacent the shoulder 6.

The head 23 has a tapered face 27 on its upper end which merges the diameter of the coupling with the passage 28 in the valve assembly. A valve member 30 is arranged within the skirt 22 for sliding movement by having a stem 31 arranged in the guide portion 32. A spring 33 normally urges the valve against the beveled seat 34 on the base of the head 23. The wings 35 hold the valve assembly centered in the coupling 16.

With the parts in the position shown in Fig. 1 the tubing will be lowered into the well and any pressure in the well aided by the spring 33 will tend to hold the valve member 30 in sealing position. In this manner the thrust on the tubing due to the fact that the valve is closed is absorbed by the head 23 abutting the shoulder 6. Thus the shear plate 20 is protected against upward thrust.

When the tubing arrives at the desired position in the well the washing liquid may be pumped downwardly through the tubing and when sufficient pressure is applied the valve member 30 will move to open position and allow the washing liquid to discharge into the tail pipe and through the perforations 13. The well can

then be washed and the tubing manipulated as desired to complete the washing operation and land it in the desired position.

It is now desirable to open the tubing so that the production may flow therein and to accomplish this a ball 40 will be dropped downwardly through the tubing so as to move into the beveled seat 27 in the top of the head 23. When this ball lands in the seat 27 it will, of course, close the tubing against pressure from within the tubing. The pumps can now be started and sufficient pressure exerted inside of the tubing and against the ball 40 to effect the shearing of the plate 20. As this plate shears, the pressure will move the entire valve assembly 22 downwardly into the tail pipe 11 and it will assume the position shown in Fig. 2 where the plate has been entirely sheared. This action opens up the tubing for production and the valve assembly and the ball 40 may remain at the bottom of the tail pipe where they will not interfere with the production of the well.

What is claimed is:

1. A tubing foot piece and back pressure valve including a perforate pipe attached to the lower end of the tubing, a shear plate confined by such attachment, a valve assembly attached to said shear plate, a valve member in said assembly normally closed against upward pressure into the tubing but adapted to open by pressure from within the tubing, and means to close said assembly after the tubing has been set so that pressure from within the tubing may be exerted thereon to shear said plate and remove said assembly.

2. A tubing bottom including a coupling, a box portion on the lower end thereof, a tail pipe having a coupling with a pin member on the upper end thereof connected with said box portion, and an annular shear plate confined between said pin and box when they are assembled.

3. A tubing bottom including a coupling, a box portion on the lower end thereof, a tail pipe having a coupling with a pin member on the upper end thereof connected with said box portion, an annular shear plate confined between said pin and box when they are assembled, and a valve assembly disposed in said couplings by attachment to said shear plate.

4. A tubing bottom including a coupling, a box portion on the lower end thereof, a tail pipe having a coupling with a pin member on the upper end thereof for connection with said box portion, a shear plate carried by said valve and confined by said box and pin, and a valve assembly in said couplings including a pair of interfitting members to attach the assembly to said shear plate.

5. A tubing bottom including a coupling, a box portion on the lower end thereof, a tail pipe having a coupling with a pin member on the upper end thereof for connection with said box portion, a valve assembly in said couplings including a pair of interfitting members, a shear plate between said members and projecting between said pin and box to attach the assembly to said tubing bottom, and means to engage and close said assembly to pressure from within the tubing so as to shear said plate and release the assembly.

6. A tubing botton including a back pressure valve, shear means to retain said valve in position to close the tubing against pressure from outside the tubing, means to be positioned against the valve after the tubing has been run to close the valve against pressure from above the tubing so that an applied pressure may shear said means to remove the valve, and a tail pipe on the end of said tubing to receive said valve after it is removed.

7. A tubing bottom including a back pressure valve, shear means to retain said valve in position to close the tubing against fluid pressure from outside the tubing, a stop shoulder for said valve to prevent shearing of said means due to upward fluid pressure when the valve is closed, means to be positioned against the valve after the tubing has been run to close the valve against fluid pressure from above the tubing so that an applied fluid pressure may shear said means to remove the valve as an obstruction to flow through the tubing, and a tail pipe on the end of said tubing to receive said valve after it is removed.

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