

May 24, 1932.

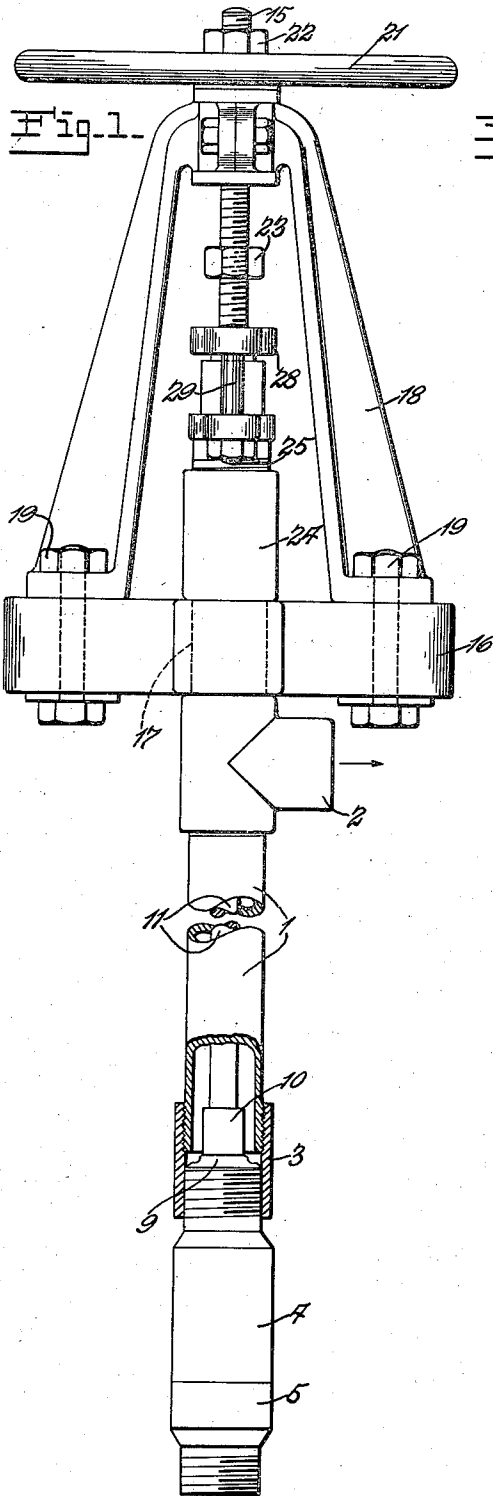
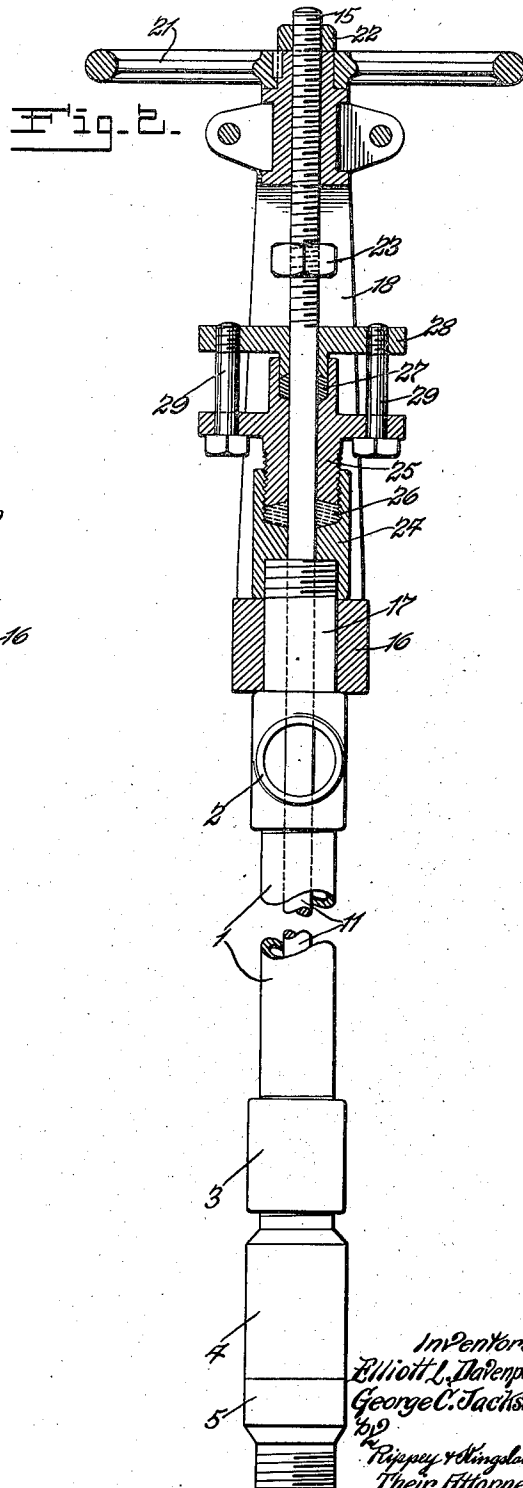
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1,860,080

ADJUSTABLE BOTTOM HOLE FLOW BEAN

Filed Feb. 26, 1930

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

Fig. 3.

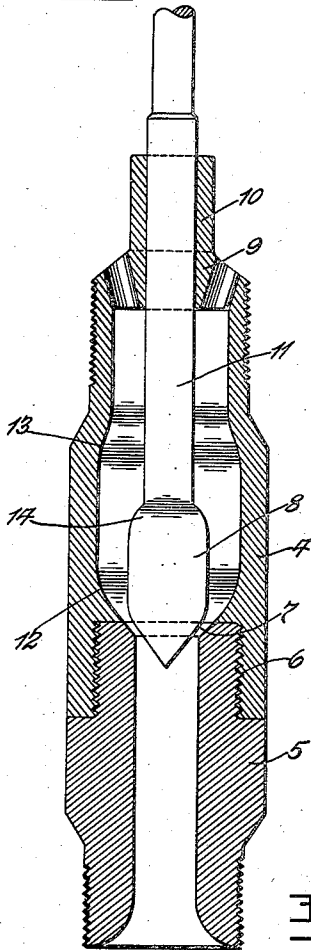


Fig. 4.

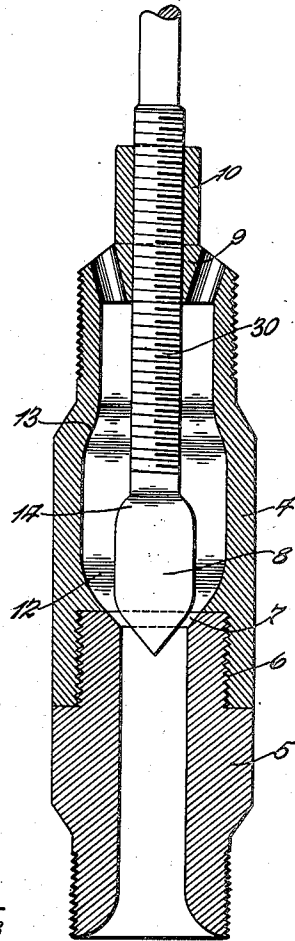
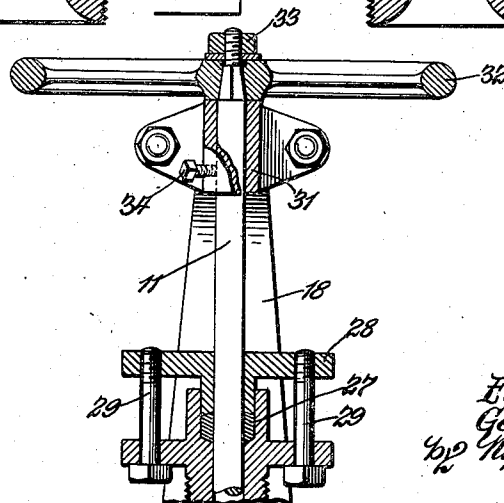


Fig. 5.



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UNITED STATES PATENT OFFICE

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ADJUSTABLE BOTTOM HOLE FLOW BEAN

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This invention relates to the art of flowing oil wells and particularly to apparatus of the type which employs a choke, or bottom hole flow bean, on the end of tubing lowered into a well.

Such a choke is used to reduce the rate of flow, and is employed both to secure a flow that may be lifted by the available pressure and to preserve the well. There is a rate of flow in each particular well that is most efficient, from the standpoint both of elevating the oil and of preserving the well. This particular rate, which may be governed by a bottom hole flow bean, varies widely with different wells, and varies from time to time in a single well. This point may not be and often is not ascertainable until after the tubing is in place. It is desirable, therefore, that a choke be provided which is adjustable after it is in position in the well.

An object, therefore, of this invention is to provide a bottom hole flow bean that is adjustable from the top of the well while the tubing is in position and which is simple in construction, easy to manipulate and free from operating difficulties.

A further object of the invention is to provide a bottom hole flow bean that will be so constructed as to eliminate eddies and turbulent flow, and thereby get the maximum lift from the available pressure.

Further objects will appear from the detail description taken in connection with the accompanying drawings, in which—

Fig. 1 is a side of the apparatus.

Fig. 2 is a view similar to Fig. 1 taken from a different angle and partially in section.

Fig. 3 is a cross-section of the bottom assembly.

Fig. 4 is a view similar to Fig. 3 of another embodiment of this invention.

Fig. 5 is a partial view similar to Fig. 2, showing the top assembly adapted to be used in connection with the embodiment shown in Fig. 4.

The apparatus embodying this invention includes generally a tubing which is lowered into the well, a choke valve assembly connected to the bottom of the tubing and ma-

nipulative mechanism at the top of the well for raising and lowering the valve stem.

A tubing 1 is lowered into the well and has a coupling 2 above the top of the well casing for the discharge of the oil and gas. A valve assembly, connected to the tubing 1 by a coupling 3, includes a shell 4 and a bottom element 5 connected thereto by a threaded connection 6. The element 5 provides a seat 7 for a valve head 8. A spider 9 on the shell 4 supports a collar or guide 10 for a valve stem 11 carrying the valve head 8.

The interior chamber formed by the shell 4 has stream line curves as indicated at 12 and 13 and forms a flush connection with the element 5 at the valve seat 7, and the upper end of the valve head 8, as shown at 14, is stream lined, so as to prevent eddy currents and thus add to the efficiency of the apparatus.

The valve stem 11 is elongated and extends to the top of the well and outside the tubing 1. At its upper end it carries helical threads 15, by which vertical adjustments can be made. This adjustment may be accomplished by a number of different mechanisms, but a suitable construction is similar to that employed in the ordinary vertical lift gate valve. As exemplified in the drawings it may include a base 16 through which passes the head end 17 of the casing 1. The base 16 supports a yoke 18 secured to it by bolts 19. The top of the yoke provides a bearing for a rotatable collar 20 having internal threads to engage with threads 15 on the top of the elongated valve stem 11. The wheel 21 is keyed to the collar 20 and provides means for manual rotation of the collar and thus imparting a vertical lift to the valve stem 11. Lock nuts 22 and 23 may be provided for securing the stem in selected position. A packing box assembly is provided which may include a fitting 24 having internal threads to receive the threaded end of the packing element 25 enclosing the packing gland 26. The upper end of the element 25 has an annular flange providing a box to receive the packing gland 27 held in position by the packing element 28. The element 27 is secured and adjusted with respect to the element 26 by screw bolts 29.

In the embodiment shown in Figs. 1, 2 and 3, the position of the valve head 8 with respect to its seat 7 may readily be adjusted by turning the hand wheel 21, thus imparting a vertical lift to the valve stem and the valve head. The valve may be held in any selected position by tightening the lock nuts 22 and 23.

In the embodiment shown in Figs. 4 and 5, the valve stem 11 is provided with helical threads 30 which cooperate with internal threads in the collar 10 of the bottom assembly. The valve stem 11 is, as shown in the other embodiment, elongated and passes through the tubing to the top of the well. Adjustment may be made by merely turning the elongated valve stem 11 at the top of the well, the lift of the head being occasioned by the rotation of the threads 30 in the cooperating element 10. Various types of mechanism may be provided to secure this adjustment. In Fig. 5, there is illustrated a particular type of apparatus somewhat similar in construction to that illustrated in Figs. 1 and 2. In fact it differs only in the relationship between the wheel and the stem, and between the stem and the yoke. The head of the yoke 18 is formed to provide a journal 31 for the upper portion of the stem 11, which in this case is smooth. The wheel 32 is splined on the stem 11 and secured thereto by the nut 33. A set screw 34 passing through the journal 31, provides means for securing the stem in any selected position. In the embodiment shown in Figs. 4 and 5, the wheel 32 is fixed to the stem 11. Thus when the wheel 32 is turned, and with it the stem 11, the valve head 8 is moved with respect to its seat 7, by reason of the cooperation of the helical threads 30 with complementary internal threads in the collar 10 of the bottom assembly.

It will thus be seen that mechanism has been provided which accomplishes the objects intended.

Various changes can be made in the details of construction within the scope of the appended claim without departing from the spirit of this invention.

I claim:

A device of the class described in combination with a tubing adapted to be lowered into a well, a choking element comprising a shell mounted on the bottom end of the tubing said shell having a spider providing a bearing for a valve stem, a valve seat mounted on the bottom of the shell, a valve head secured to the valve stem, an elongation of the stem extending to the top of the well, and means including threads on the stem for adjusting the valve head with respect to the seat.

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