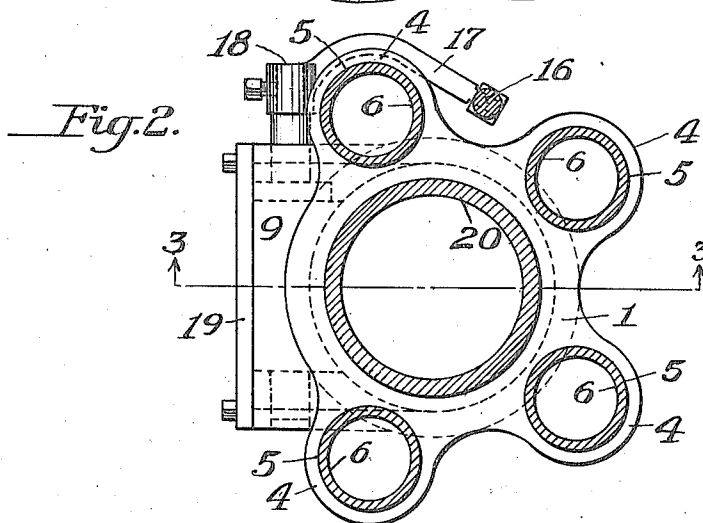
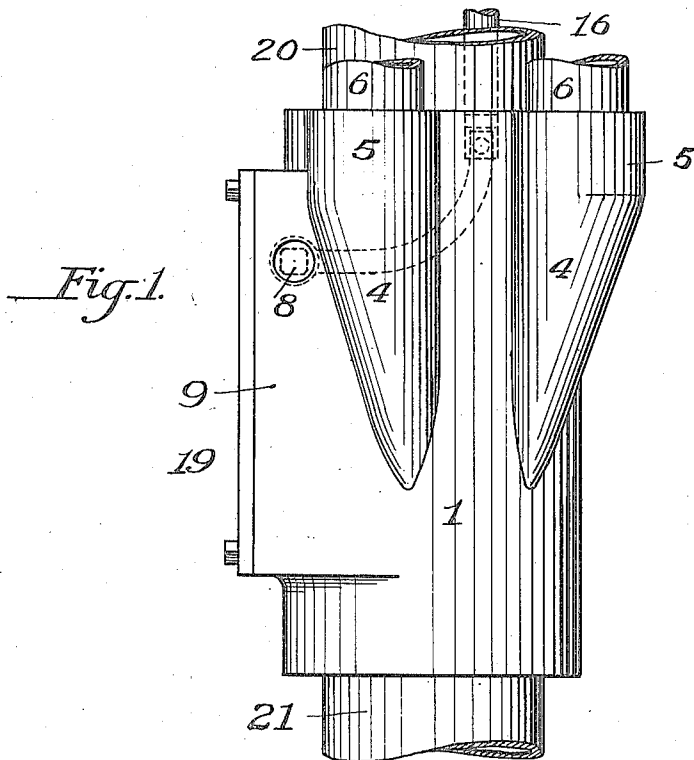


R. L. FLETCHER.
CASING HEAD.
APPLICATION FILED OCT. 20, 1917.

1,255,147.

Patented Feb. 5, 1918.

3 SHEETS—SHEET 1.



Witnesses

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Richard Townsend

Inventor

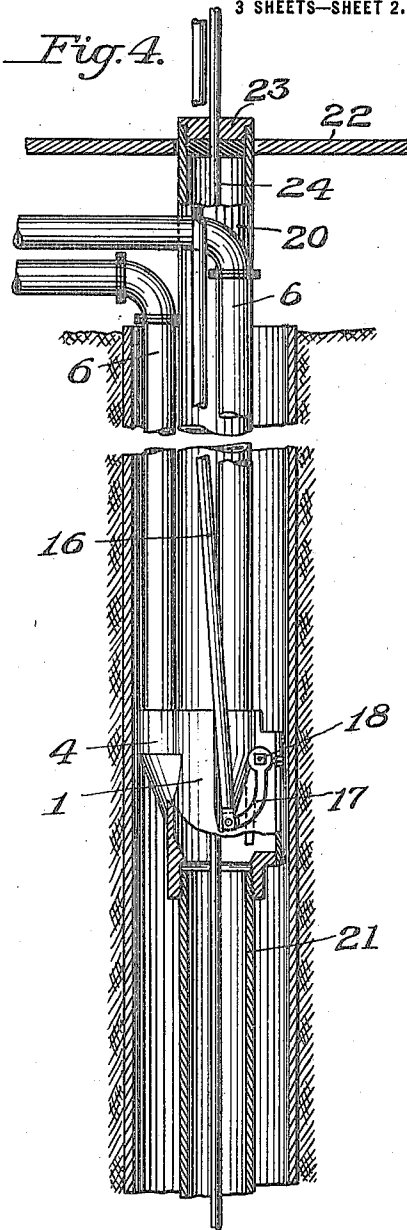
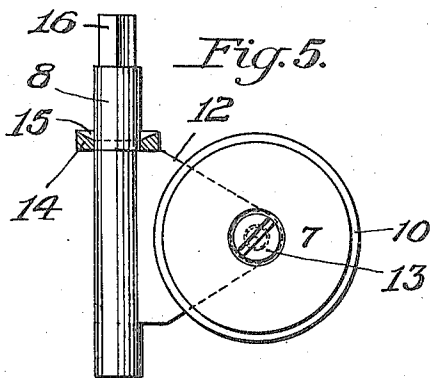
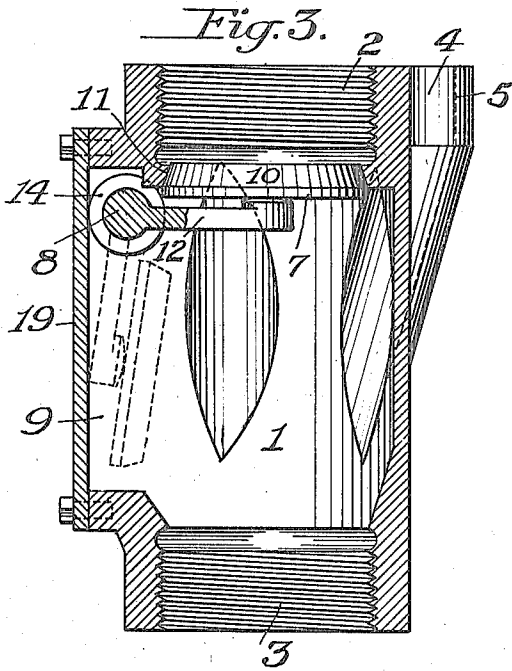
Roy L. Fletcher
by William B. Wharton
his attorney

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3 SHEETS—SHEET 2.



Witnesses
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3 SHEETS—SHEET 3.

Fig. 7.

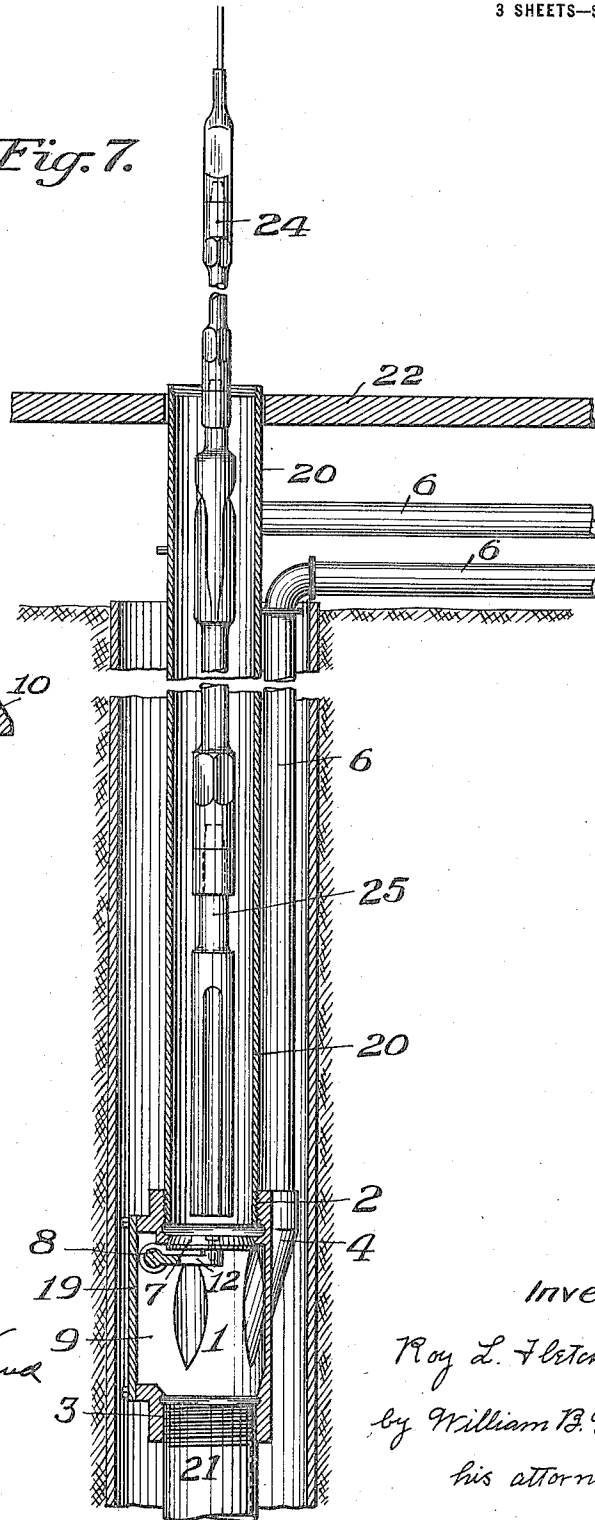
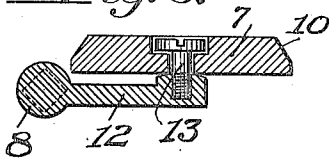


Fig. 6.



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UNITED STATES PATENT OFFICE.

ROY L. FLETCHER, OF CAMERON, WEST VIRGINIA.

CASING-HEAD.

1,255,147.

Specification of Letters Patent.

Patented Feb. 5, 1918.

Application filed October 20, 1917. Serial No. 197,580.

To all whom it may concern:

Be it known that I, ROY L. FLETCHER, a citizen of the United States, and resident of Cameron, Marshall county, West Virginia, have invented a new and useful Improvement in Casing-Heads, of which the following is a specification.

This invention relates to a casing head for use in oil and gas wells.

In drilling oil and gas wells great difficulty has been encountered in capping the well and preventing loss of fluid upon striking any considerable flow of oil or gas. It is therefore, an advantage to provide means for cutting off the flow through the main bore of the casing, and for leading off the fluid to a suitable receiving tank. Prior forms of casing head designed for this purpose have, however, presented obvious disadvantages in that they cannot be used without interfering with the progress of the drilling operations, and have not provided by-passes of such form and capacity as to readily lead off the fluid during a strong flow thereof.

The object of the present invention is to provide a casing head so formed that it will not interfere with the drilling operations at any stage thereof, and which is so constructed and is provided with by-passes of such form and capacity that it is capable of diverting a strong flow of fluid from the main bore of the casing without retarding such flow.

This object is attained by so forming the casing head and the by-passes therefrom, that the by-passes are of great capacity and of such form as to permit ready entrance of oil thereinto. Further the construction of the by-passes and of the casing head in general is such that it may be located within the well and an appreciable distance below the derrick floor. Because of such location of the casing head, the flow of oil through the casing may be cut off and the oil permitted to flow through the by-passes without completely withdrawing the string of drilling tools from the well, but permitting them to extend thereinto such distance as will allow ready uncoupling of the string at a point above the mouth of the well and derrick floor. The use of such a casing head, moreover, permits a continuous flow of oil through the by-passes during the continuance of the drilling operation, and further permits the by-pass pipes to be disposed be-

neath the derrick floor, so that they do not interfere with operations conducted thereon.

In the accompanying drawings, Figure 1 is an elevation of the casing head; Fig. 2 is a plan view thereof; Fig. 3 is a vertical section on the line 3—3 Fig. 2; Fig. 4 is a view showing the casing head in position in a well during actual drilling operations; Fig. 5 is a plan view of the casing head valve; Fig. 6 is a vertical section through the valve; and Fig. 7 is a sectional view through the well and casing head showing the string of drilling tools in position for uncoupling.

The casing head comprises a tubular body member 1 interiorly screw-threaded at its extremities, as at 2 and 3 respectively, for attachment to sections of well casing, the diameter of the interior bore of the member 1 being determined by the diameter of the final string of casing employed in the drilling operation, such casing being commonly of standard diameter. Cast integral with the tubular body member 1 are a plurality of upwardly extending by-passes 4, communicating with the interior bore of the tubular member 1, and screw-threaded at their upper extremities 5 to receive vertically extending pipes 6 for conducting the fluid to a receiving tank. These by-passes are so arranged that they project outwardly from the body of the casing a gradually increasing distance upwardly thereof, with the exception of their uppermost portions which are arranged to receive the pipes 6; and at the point of their greatest extension extend outwardly from the casing a distance no greater than the diameter of the by-passes themselves. It will be seen that this by-pass arrangement permits pipes to be attached to the casing head without the use of elbows, and that this arrangement therefore economizes space within the well and permits the casing head to be secured to sections of casing and placed any desired distance below the mouth of the well. In cases where a cellar is provided beneath the derrick floor so that a casing head of relatively large horizontal dimensions may be set the desired distance below the derrick floor, the number of by-passes may be reduced and their size increased. In such case, however, the form of by-pass shown is still of material advantage, since it permits ready flow of oil from the casing head, and thus thereby retards the flow and does not cause

undue pressure against the casing head valve.

In order to close the main bore therethrough, the casing head is provided with a flap valve 7, secured to a rock shaft 8 having bearings in an extension 9 of the tubular member 1. The face 10 of the flap valve is conical in form so that it seats closely in the seat 11 formed in the tubular member 1 and completely prevents leakage of fluid therethrough. The valve member 7 is secured to the arm 12, secured to or formed integral with the rock shaft 8, by means of bolt 13 passing through the valve member, the bolt 13 being so disposed that the valve 7 is enabled to rock slightly thereon and thus readily find its seat in the casing head. In Fig. 3 the valve is shown in full lines seated, and in dotted lines in its open position, in which latter it is so disposed as to leave the bore of the casing head unobstructed. In order to prevent leakage past the through bearing of the rock shaft 8 in the extension 9 of the casing head, the rock shaft is provided with a collar 14 arranged to bear against the inner surface of the extension 9 and provided with an annular gasket receiving groove 15 surrounding the shaft. In order to provide room for the extension 9 without unduly increasing the lateral extent of the casing head, the by-passes 4 are arranged in pairs, the by-passes of one such pair being so spaced from each other as to provide space for the extension 9 between them. This arrangement provides by-passes and by-pass pipe connections having a capacity approaching that of the central bore of the casing head, while keeping the horizontal extent of the casing head within such limits that it may readily be contained within the bore of the well. The capacity of the by-pass is of importance in preventing an undue pressure against the valve 7 upon striking a heavy flow of oil or gas, while the inclined position or formation of the by-passes assists in leading off the fluid by permitting a ready entrance thereof into the by-passes.

In order that the valve 7 may be actuated from a point above the well mouth a suitable operating lever 16 is provided. This lever at its lower extremity is pivotally secured to a curved lever member 17 rigidly secured at its other extremity to the extending portion 18 of the rock shaft 8. It will be seen that the tapered form of the by-passes 4 permits the curved portion 17 of the operating lever to pass around one of the by-passes and beneath its most extended portion so that space is to the highest degree economized. The form and manner of attachment of the lever 16, moreover, permit the valve to be rotated through the necessary arc with a minimum lateral movement of the lever. To provide for the in-

section and removal of the valve and valve connections the extended portion 9 is in the form of a rectangularly formed extension or flange providing an entrance into the interior of the casing 9 greater than the diameter of the valve 7. This opening is normally closed by means of a cap 19 bolted to the extension 9 and arranged to provide a fluid-tight joint therewith.

In use of the casing head as illustrated in Figs. 4 and 7 of the drawings, it is attached to the uppermost section 20 of the well casing and to the next uppermost casing section 21 to form a connection therebetween. It will be seen that the by-pass pipes 6 may extend horizontally beneath the derrick floor 22, and may lead the fluid to a receiving tank without extending above the floor level at any point. With the valve 7 open, as shown in Fig. 4, drilling may be conducted through the bore of the casing head, and during the operation of drilling through sands giving a light production of oil, such oil will flow through the by-passes 4 and by-pass pipe 6. Under such circumstances any appreciable loss of oil may be prevented by the use of an oil saver 23 of any usual form, secured to the upper extremity of the casing 20 and surrounding the drilling line 24. When the line is withdrawn, and the oil saver 23 removed to permit removal of the string of tools 25, the drilling bit is raised to a point in the casing above the casing head and the valve 7 therein closed, as shown in Fig. 7. Under such conditions of use the flow of oil will be completely cut off from the uppermost casing section 20 by the valve 7, and directed into the by-passes 4 and pipes 6. The string of tools may be then uncoupled readily from the drilling line without any waste of oil during the operation.

Because of the possibility of placing the casing head above described below the derrick floor beneath the mouth of a well it is enabled to effect an increased saving of oil and to facilitate drilling operations. This advantage is obtained by means of the general compact and vertically arranged construction of the casing head, and by the specific construction of the parts which contribute to such general compactness. The form of the by-passes, moreover, permits them to be of great capacity, and is such that oil may readily flow therethrough. It is obvious that minor changes may be made in the form or arrangement of the casing head and by-passes, or in the form and arrangement of the valve and other points of construction, without departing from the central inventive idea, and no limitations other than those contained in the claims are therefore to be imposed.

What I claim is:—

1. A casing head comprising a tubular body

having a central bore therethrough and arranged to be connected to a well casing, and by-pass means integral with said tubular body and extending vertically thereof substantially parallel to the vertical axis of said tubular body.

2. A casing head comprising a tubular body having a central bore therethrough and arranged to be connected to a well casing, by-pass means integral with said tubular body and extending vertically thereof substantially parallel to the vertical axis of said tubular body, and means for closing said central bore.

3. A casing head comprising a tubular body member having a central bore therethrough, and a plurality of by-passes arranged to provide direct connections for vertically extending conduits, said by-passes being so disposed as to extend substantially parallel to the vertical axis of said body member and to project outwardly from said tubular body a distance no greater than the diameter of said by-passes.

4. A casing head comprising a tubular body member having a central bore therethrough and arranged to be connected to a well casing, a plurality of by-passes arranged to provide direct connections for vertically extending conduits, said by-passes being so disposed as to extend substantially parallel to the vertical axis of said body member and to project outwardly from said tubular body a distance no greater than the diameter of said by-passes, and means for closing the central bore in said casing head.

5. A casing head comprising a tubular body having a central bore therethrough and arranged to be connected to a well casing, a plurality of vertically disposed by-passes so arranged about said tubular body as to provide space for a rock shaft having bearings therein, a rock shaft in said bearings, and a valve on said rock shaft arranged to close the central bore in said casing head.

6. A casing head comprising a tubular body member having a central bore therethrough and arranged to be connected to a well casing, a plurality of vertically disposed by-passes arranged to extend substantially parallel to the vertical axis of said body member and being of increased diameter upwardly of their extent, a valve arranged to

close the central bore in said casing head, and means operable from the well mouth for actuating said valve.

7. A casing head comprising a tubular body member having a central bore therethrough and arranged to be connected to a well casing, a plurality of vertically disposed by-passes so arranged about said tubular body as to provide space for a rock shaft having bearings therein, a rock shaft having bearings in said body member, a valve in said rock shaft arranged to close the central bore in said casing head, and means operable from the well mouth for actuating said valve.

8. A casing head comprising a tubular body member having a central bore therethrough and arranged to be connected to a well casing, a plurality of vertical by-passes on said body member and of increased diameter upwardly of their extent, said by-passes being so arranged about said body as to provide space for a rock shaft having bearings therein, a rock shaft having bearings in said body member, and a valve arranged to close the central bore in said casing head.

9. A casing head comprising a tubular body member having a central bore therethrough and arranged to be connected to a well casing, and vertically extending by-passes on said body member and of increased diameter upwardly of their extent, said by-passes being so disposed as to extend substantially parallel to the vertical axis of said body member and to project outwardly from said body a distance no greater than the diameter of said by-passes.

10. A casing head comprising a tubular body having a central bore therethrough and arranged to be connected to a well casing, by-pass means integral with said tubular body and arranged to extend vertically thereof substantially parallel to the vertical axis of said tubular body, a valve arranged to close the bore through said casing head, and means for actuating said valve.

In witness whereof, I have hereunto set my hand.

ROY L. FLETCHER.

Witnesses:

FLOYD STROPE,
J. I. ELLIS.