June 2, 1925. 1,540,209

C. E. FRAZIER

CHOKE VALVE

Filed May 10, 1923

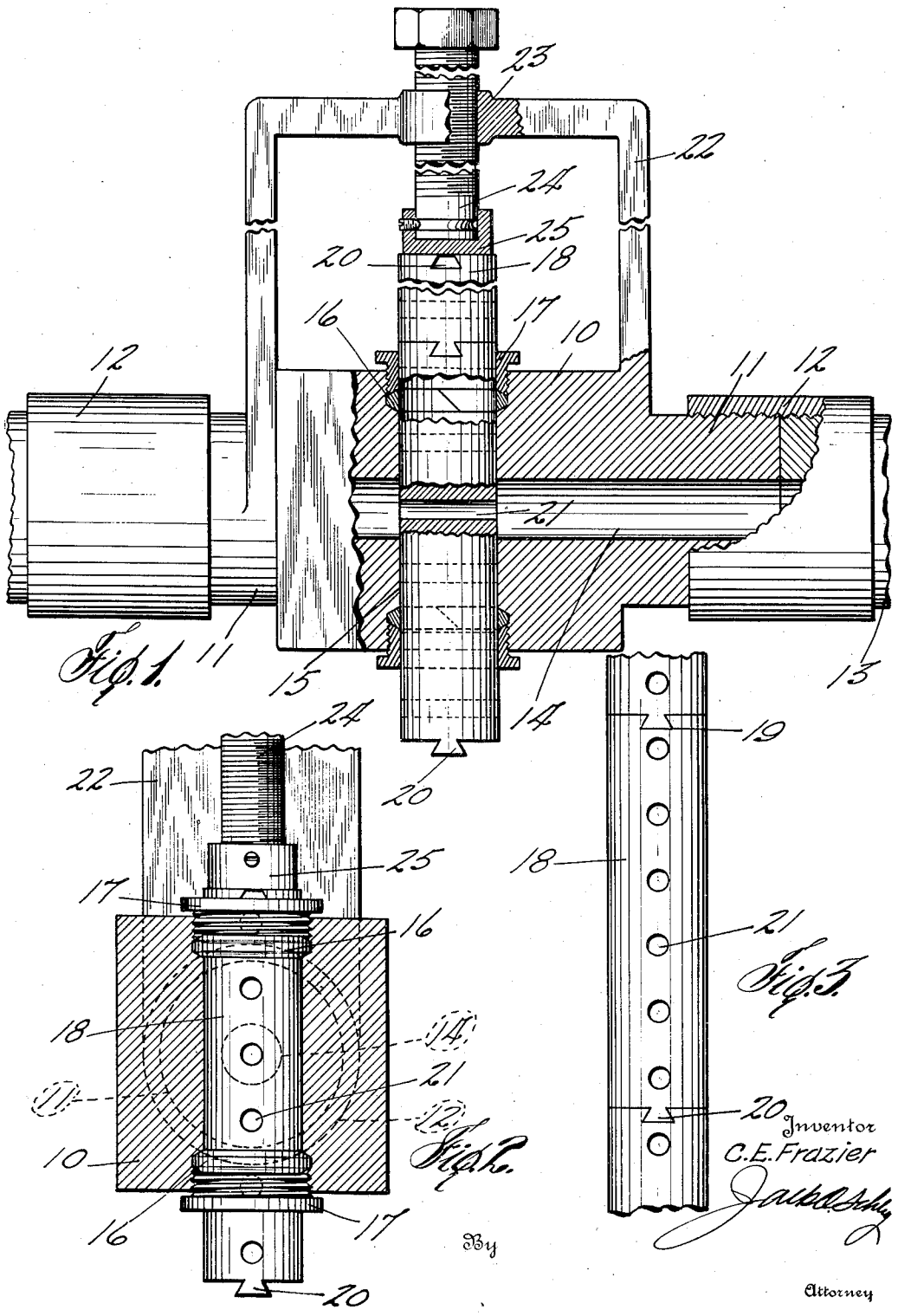


Fig. 1.

Fig. 2.

Fig. 3.

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Patented June 2, 1925. 1,540,209

UNITED STATES PATENT OFFICE.

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CHOKE VALVE.

Application filed May 10, 1923. Serial No. 637,967.

To all whom it may concern:

Be it known that I, CHARLES E. FRAZIER, a citizen of the United States of America, residing at Dallas, in the county of Dallas and State of Texas, have invented certain new and useful Improvements in Choke Valves, of which the following is a specification.

This invention relates to new and useful improvements in choke valves.

In the pumping of oil wells, where the flow is copious it is necessary to reduce the flow by inserting a suitable reducing or choke valve in the discharge pipe. The rate of flow is controlled by the size of the passage in the plug of the valve. Owing to the fact that sand is present in such flows of oil and the oil is under comparatively high pressure, the sand will in a few hours, cut the valve passage to the point that the flow becomes so excessive as to require the installation of a new valve.

Under the present practice it is necessary to shut off the flow of the oil, disconnect the valve and insert a new one in the discharge pipe. This involves a loss of time, an added expense and considerable waste in production.

The object of the invention is to provide a valve structure having renewable valve plugs arranged to be successively introduced into the oil passage and each having a plurality of oil ports spaced so that when one is moved out of the oil passage, the next successive port will be brought into the passage. The size of the ports are determined before the plugs are inserted and the plugs are each bored with same size of ports.

Another feature resides in means separate from the plugs arranged to be screwed down to push the plugs through the valve casing without turning said plugs.

A further object resides in forming the plugs so that they may be jointed together in sequence, the adjacent ports of adjoining plugs, being spaced the same as the other ports of the plug.

A construction designed to carry out the invention will be hereinafter described, together with other features of the invention.

The invention will be more readily understood from a reading of the following specifications and by reference to the accompanying drawings, in which an example of the invention is shown, and wherein:

Fig. 1, is a longitudinal vertical sectional view of a choke valve constructed in accordance with my invention.

Fig. 2, is a transverse vertical sectional view taken in the line 2—2 of Fig. 1, and

Fig. 3, is an elevation of one of the plugs.

In the drawing the numeral 10 designates a valve doby or casing which is preferably formed of hardened steel and is formed on each end with a nipple 11, externally screw threaded. The nipples 11 receive coupling collars 12 by which the valve is connected in a discharge pipe line 13. The casing has a longitudinal passage 14 extending therethrough and registering with the bore of the pipe line. The casing has a vertical bore 15 bi-secting the passage and preferably of larger diameter than said passage. At the top and bottom of the bore packing glands are formed by packing rings 16 and gland nuts 17, which are counter-sunk in the casing, said nuts compressing the rings. A plurality of choke plugs or cylinders 18 are provided and are inserted in the bore so as to extend through the packing glands, thus preventing fluids leaking from the bore.

Each plug is larger than the bore and has a dove-tail socket 19, at its upper end and a dove-tail lug 20 at its lower end. By this arrangement the bottom of a following plug may be attached to the top of the preceding plug so as to follow through the bore in proper sequence. Each plug is provided with a plurality of equally spaced transverse ports 21 arranged in the same vertical plane and the lugs and sockets are so disposed that the ports of one lug will align vertically with those of attached plugs. The ports at the ends of a plug are spaced from said ends so that when two plugs are coupled, the adjacent ports of each plug will be spaced the same distance as the other ports.

The ports are spaced on centers substantially the diameter of the bore so that when the plug is forced downwardly one port rides out of the bore as the other is brought thereinto. The plugs are always moved downwardly in a straight line and never moved upwardly or turned.

For pushing the plugs through the valve, I mount a yoke 22 on the casing 10, which yoke has a central internally screw threaded boss 23, at its upper end. A screw 24 is threaded through the boss and has a ferrule 25 swiveled on its lower end. The ferrule

has a flat under side for bearing on the uppermost plugs and being held against rotation while the screw is turned. The yoke is high enough to permit an additional plug to be attached to the plug in the casing, and positioned under the ferrule.

In using the valve a plug 18 is selected which has ports of the diameter necessary to give the desired flow through the valve. The screw 24 is backed up so that the ferrule is elevated high enough to insert the plug thereunder. The lower end of the plug is inserted in the gland 17 at the top of the casing and the ferrule screwed down on top of said plug. The plug is forced downward until the first port 21 rides into the bore 14. Any suitable means may be employed, as gauge marks (not shown) on the plug, for stopping the plug with the ports in the center of the bore. When the port is cut, by the abrasive action of the sand flowing with its oil, to the point where the flow becomes excessive, the plug may be moved downward by the screw 24 to bring the next port into the bore.

The ports are spaced so that as one rides out of the bore the next one will ride into the same. When the plug has been forced down to the position shown in Fig. 1, the screw 24 is backed-up and the ferrule raised to the point, where an additional plug may be inserted. The dove-tail 20 on the bottom of the added plug is inserted in the socket at the top of the plug in the valve and the ferrule screwed down on top of the added plug. In this way the plugs may be forced through the valve. The plugs are not turned or raised. The plug having a tight fit it will be seen that the screw 24 will turn in the ferrule 25 and thus not rotate the plug. While the plug has a snug fit in the bore it is free to be moved downwardly, but its frictional engagement with the bore is sufficient to resist the torque of the screw which will rotate in the ferrule 25 of the swivel.

Various changes in the size and shape of the various elements, as well as alterations and modifications, may be made within the scope of the appended claims.

What I claim, is:

1. In a choke valve for oil pumping lines, a valve casing having a longitudinal passage and a vertical bore intersecting the passage, a plug element slidable through the bore and comprising replaceable plug members adapted to be ejected from the bore, said plug members each having transverse ports, and means for pushing the plug element through the bore.

2. In a choke valve, a valve casing having a longitudinal passage extending therethrough and a vertical bore intersecting said passage, a plurality of plugs adapted to pass in successive order entirely through said bore and having ports spaced to successively register with said passage when the plugs are placed end to end, and means separate from the plugs for forcing the plugs through the bore.

3. In a choke valve, a valve casing having a longitudinal passage extending therethrough and a vertical bore intersecting said passage, a plurality of plugs adapted to pass in successive order entirely through said bore and having ports spaced to successively register with said passage when the plugs are placed end to end, packing glands at each end of the bore through which the plugs are passed, and means separate from the plugs for forcing the plugs through the bore.

4. In a choke valve, a valve casing having a longitudinal passage extending therethrough and a vertical bore intersecting said passage, a plurality of plugs adapted to pass entirely through said bore and having ports spaced to successively register with said passage when the plugs are placed end to end, packing glands at each end of the bore through which the plugs are passed, a support on the valve casing, a screw mounted in the support, and a ferrule swivelled on the lower end of the screw for engaging the plugs.

5. The combination with a choke valve casing having a longitudinal passage and a vertical bore intersecting said passage, of a plurality of individual plugs having means for joining their ends together and provided with ports spaced to successively register with the passage, and means separate from the plugs for forcing the plugs through the bore.

6. In a choke valve for oil pumping lines, a valve casing having a longitudinal passage and a vertical bore intersecting said passage, a plurality of replaceable plugs each having a tight sliding fit in the bore of the casing and provided with ports spaced to successively and individually register with the passage, said plugs being placed end to end and movable downward only, and means separate from the plugs for pushing the plugs down through the casing bore.

7. In a choke valve for oil pumping lines, a valve casing having a longitudinal passage and a vertical bore intersecting the passage at substantially right angles thereto, a replaceable plug fitting snugly in the bore for passage downward entirely therethrough, a yoke over the vertical bore mounted on the casing and extending sufficiently high for the insertion of additional plugs between the casing and the top of the yoke, and a screw mounted in the yoke engaging the upper end of the plug.

In testimony whereof I affix my signature.

CHARLES E. FRAZIER.