M. J. TRUMBLE.

CUSHIONING FLOW FITTING FOR OIL WELLS.

APPLICATION FILED MAY 15, 1920.

1,436,417. Patented Nov. 21, 1922.

Fig. 1.

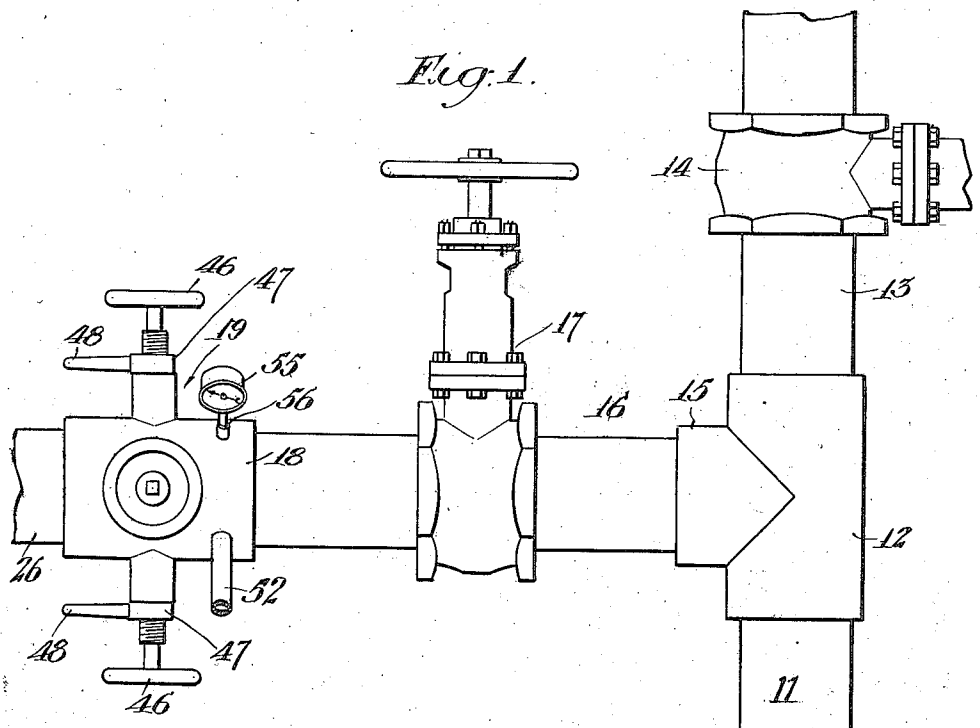


Fig. 2.

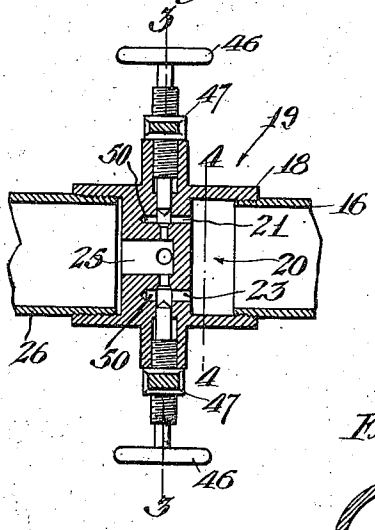


Fig. 3.

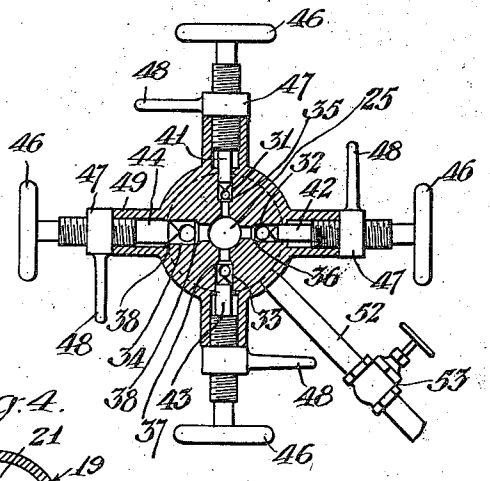
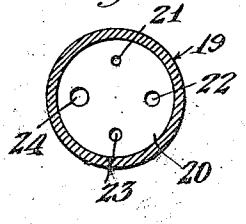


Fig. 4.



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UNITED STATES PATENT OFFICE.

MILON J. TRUMBLE, OF ALHAMBRA, CALIFORNIA.

CUSHIONING FLOW FITTING FOR OIL WELLS.

Application filed May 15, 1920. Serial No. 381,785.

To all whom it may concern:

Be it known that I, MILON J. TRUMBLE, a citizen of the United States, residing at Alhambra, in the county of Los Angeles and State of California, have invented a new and useful Cushioning Flow Fitting for Oil Wells, of which the following is a specification.

My invention relates to the art of oil production, being more particularly a device placed in the oil discharge pipe of a flowing well whereby the flow of oil is regulated. In flowing wells, particularly those producing large quantities of gas and oil under great pressure, if the flow is not properly controlled and pressure held on the well, sand and shale is thrown out thereby creating or forming a cavity in the bottom of the well the walls of which are liable to cave in thereby sealing the bottom of the well pipe, so that the life of the well is prematurely terminated. Nipples having a reduced orifice have heretofore been placed in the discharge line to hold the pressure on the well but have been unsatisfactory due to the fact that the sand and grit carried by the oil cuts the walls of the orifice in the nipple until the orifice is enlarged to such an extent that in a very short time the flow is increased, resulting in the well getting from under control and blowing itself out. Ordinary valves placed in the line in addition to the nipple do not remedy the fault as it frequently happens that the destruction of the nipple by the sand occurs when no one is on duty looking after the well, and the sand carried by the oil erodes the valve and soon wears or cuts the same out so that no control is had over the flow of oil from the well. For that reason a line equipped with both an ordinary valve and nipple is at times wholly insufficient in controlling the flow of oil.

My invention comprises the combination of a head provided with suitable perforations arranged therein and extending therethrough whereby oil may be permitted to pass from one side of such head to the opposite side thereof, and suitable valve means arranged in and carried by such head to control the passage of oil through such perforations and means on one side of such head adapted and arranged to engage with a conducting pipe conveying oil from a well to such head and means arranged upon the opposite side thereof adapted to engage with a conducting pipe arranged to convey oil away from such head.

The principal object of my invention is to produce a fitting adapted to be placed in the line of standard piping commonly used for conducting oil from the well, such fitting being of simple form and construction and having the parts thereof so arranged that a stream of oil flowing through the same is directed against and cushioned upon a body of oil to prevent the cutting out of the oil outlet.

A further object of my invention is to produce a device of the character described adapted to be placed in the conducting or discharge line of a well, and so arranged and constructed that the oil passing through the line may be divided into one or more streams of different sizes, each of said streams being directed in such a manner that they are each cushioned during their flow through the device.

A further object of my invention is to produce a device of the character described in which a series of openings are formed communicating with the inlet side of the device, such openings being provided with cushioning pockets arranged to contain a body of oil, whereby the oil in passing through such openings is cushioned against a body of oil thereby preventing cutting of the walls of the openings and consequent enlargement thereof.

Other objects and advantages will appear hereinafter from the following specification.

Referring to the drawings, which are for illustrative purposes only,

Fig. 1 is a side elevation of the upper end of the casing of an oil well showing the discharge line and a device in such discharge line embodying a form of my invention.

Fig. 2 is a vertical cross sectional view through the device shown in Fig. 1.

Fig. 3 is a vertical cross-sectional view on line 3—3, Fig. 2.

Fig. 4 is a cross-sectional view on line 4—4, Fig. 2.

11 designates the top of a casing such as found in the ordinary oil well, to which is threaded a T 12. A short pipe 13 is threaded into the top of the T and is provided with a valve 14. The branch 15 of the T has threaded thereinto one end of a pipe 16, such pipe being provided with a gate valve 17. The outer end of the pipe 16 is threaded into the inlet end 18 of the fitting 19, a

chamber 20 being formed on the end 18 which receives the oil from the pipe 16. Longitudinally extending into the body of fitting 19 from the chamber 20 is a plurality of openings 21, 22, 23 and 24.

Arranged centrally in the body of the fitting is an expansion chamber 25 closed at its inner end and opening at its outer end into a discharge pipe 26 threaded into the discharge end of the fitting. Radially extending outwardly from the chamber 25 is a plurality of ducts or passages 31, 32, 33 and 34. Each of these passages crosses the path of one of the openings heretofore described and affords a communication from its associated opening to the expansion chamber; the openings 21 to 24 inclusive and the ducts 31 to 34 inclusive together form channels of different dimensions through which the oil passes from the inlet to the discharge end of the fitting.

The ducts are each provided with a valve seat, numbered respectively 35, 36, 37 and 38, arranged to co-act with needle valves 41, 42, 43 and 44 respectively. Each of such needle valves is threaded into the fitting and is provided at its outer end with suitable hand operating means 46. Provision is made whereby a quick adjustment of each needle valve may be made, which consists of a nut 47 on each valve, such nut being provided with a handle 48, the nut being seated against the outer end of a boss or extension 49 through which the valve member extends.

It is to be particularly noted that the inner or closed end of each opening beyond its communication through its associated duct to the chamber forms a pocket 50 and that the ducts 31 to 34 inclusive are arranged opposite each other, the arrangement of such pockets and openings being for the purpose more fully pointed out hereinafter.

The device operates in the following manner:

Assuming that the well has started to flow under considerable pressure, the valve 14 is closed and valve 17 opened thereby permitting the oil to flow through the pipe 16 into the chamber 20 in the fitting. From the chamber 20 the oil will flow into each and all of the openings 21 to 24, inclusive, the associated duct of which is open, that is, such openings in which the needle valve has been moved away from the seat. The oil in the chamber 20, carrying with it particles of sand, passes through the openings 21 to 24, inclusive, that is, assuming that all of the valves are open, and cushions itself against the oil in the pockets 50. The oil then flows from the openings through the ducts 31 to 34, inclusive, into the expansion chamber 25 and as the streams of oil enter such chamber, the openings being directly opposite each other, the streams meet and cushion against each other. The oil passing from the expansion chamber 25 is again permitted to expand and decrease its velocity as it enters the pipe 26 due to the fact that the pipe 26 is of much larger diameter than the expansion chamber.

The result of permitting the oil to impinge against the pools of oil in the pockets and in the chamber 25, as heretofore described, is that the grit and sand is not directed against the metal of the fitting and for that reason does not eat into the metal and destroy the device. In the event that foreign material accumulates in the chamber 20, such material may be discharged through a pipe 52, provided with a suitable valve 53. Further, the valves of the fitting may be adjusted individually or collectively to maintain the flow under any certain desired pressure, the pressure of the oil entering the fitting being indicated by a gauge 55 which is connected by a pipe 56 with the interior of the chamber 20.

By regulating the flow of the well as above described the pressure or head on the well is controlled at nearly normal condition under which circumstances the walls of the well remain intact and the oil supply is maintained through the flow of oil from the surrounding formation into the well.

I claim as my invention:—

1. A flow regulating device for oil wells through which the oil from the well is discharged, comprising a fitting in the discharge pipe having an expansion chamber, and a passage connecting the expansion chamber to the inlet end of the fitting, said passage having a pocket formed therein adapted to retain a body of oil against which the incoming oil is directed.

2. A flow regulating device for oil wells through which the oil from the well is discharged comprising a fitting in the discharge pipe having an expansion chamber, said chamber having a radially extending duct having a valve seat therein, a valve member co-acting with said seat, said duct communicating with a longitudinally extending opening communicating with the inlet connection of the fitting and having a pocket formed therein beyond the duct for retaining a body of oil against which the oil flowing into the opening is directed.

In testimony whereof, I have hereunto set my hand at Los Angeles, California, this 6th day of May, 1920.

MILON J. TRUMBLE.