Jan. 15, 1929. 1,698,826

W. D. SHAFFER

FLOW NIPPLE

Filed Sept. 13, 1926

Fig: 1

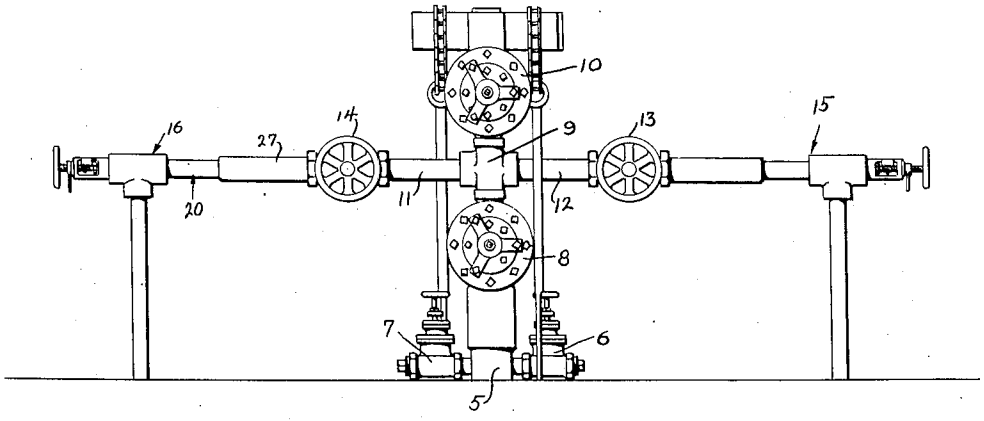


Fig: 2

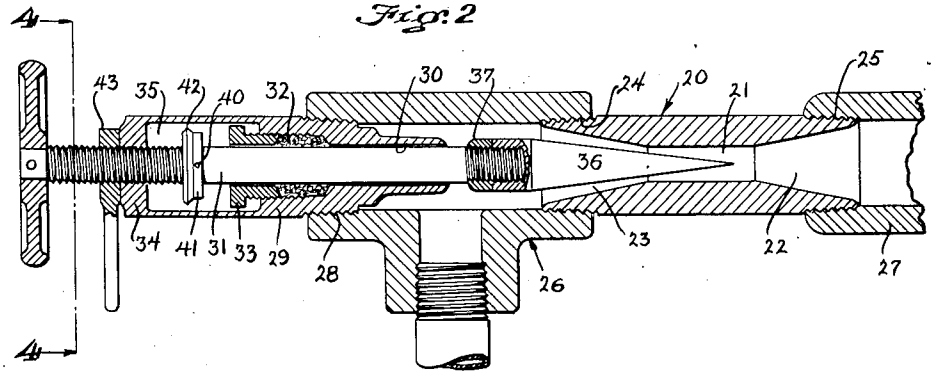


Fig: 3

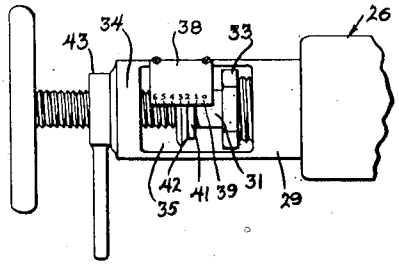
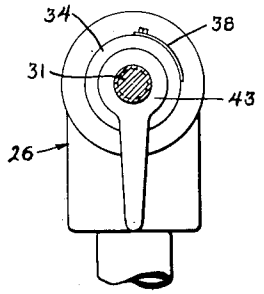


Fig: 4



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UNITED STATES PATENT OFFICE.

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FLOW NIPPLE.

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This invention relates specifically to a device for controlling the flow of oil wells.

An important object is to provide a manually operated valve mechanism for oil wells that will effectively control the rate of oil flow from the well in a gradual manner.

Another object is to provide a simple device in which the rate of flow from an oil well may be quickly and easily adjusted without the necessity of shutting off the flow.

A further object is to provide an adjustable "flow nipple" for oil wells that can be quickly regulated to prevent an emulsification of the flowing oil with any water should the same be associated therewith.

Still another object is to combine with the adjusting device a tube having a tapered inlet and outlet together with a means for indictating the size of the discharge opening at which the flow nipple is set.

Further objects and advantages will appear from the following description, reference being had to the accompanying drawings, in which:

Fig. 1 is a front elevation of the oil discharge pipe lines of an oil well showing the adjustable "flow nipple" in place in said lines.

Fig. 2 is a longitudinal section through the device.

Fig. 3 is a partial side elevation of one end of the device showing the indicating scale.

Fig. 4 is a transverse section taken on line 4—4 of Fig. 2.

Some oil and gas wells produce by natural flow, but if the flow is uncontrolled grave damage to the well is likely to result. Frequently the flow is under great pressure and usually accompanied by sand. In such cases the usual valves can not be successfully employed to regulate the rate of flow, and in order to successfully restrict the same an ordinary apertured plug is inserted in the flow line.

The size of the opening in the plug is usually determined by trial after the well starts to flow, but in order to change the rate of flow the discharge line must be first closed, or the flow diverted to another pipe line while the change in the plug is effected. This method of flow control necessitates a large assortment of "flow nipples" provided with openings of varying diameters, and as the wells are often quite sensitive to sudden changes in the rate of flow such changes in "nipples" on alterations in the rate of flow are not generally desirable.

In the "flow nipple" now usually employed the aperture therethrough is of uniform diameter, thereby tending to form an emulsification of the oil with any water that might be present therein.

It is well known that the flow of liquids through orifices having tapered inlets and outlets is much smoother and faster than through orifices which abruptly reduce the flow. By using such a tapered tube in combination with a needle valve and a means for indicating the size of the discharge orifice, the above recited disadvantages are largely obviated, the device effectively controlling the rate of oil flow from the well in a gradual manner.

Referring now to the drawings and especially to Fig. 1, my improved "flow nipple" is illustrated in connection with a typical arrangement of pipe fittings and flow lines at the top of a flowing well which is commonly termed a "Christmas tree". In the construction illustrated, 5 designates the upper end of a string of well casing provided with valve controlled gas outlets 6, 7, gate valve 8, cross fitting 9, gate valve 10 thereabove together with other usual fittings, all of which forms no part of the present invention.

The horizontally disposed outlets of the cross fitting 9 provide outlets for the flow of oil through nipples 11, 12, controlled by gate valves 13, 14 to the flow nipples 15, 16 having regulating valves 17, 18.

The flow nipple as illustrated herein preferably consists of a tube 20 having a central bore 21 of uniform diameter throughout its length, the ends of the bore merging into conical bores 22, 23, at the ends thereof of the same diameter as the flow lines.

The ends of tube 20 are externally threaded as at 24, 25 engaging one end of a T fitting 26, and a nipple 27 respectively, the other end of the nipple being connected to the gate valve 14.

Detachably secured in the opening 28 of the T fitting 26 is a plug 29 provided with a central bore 30 for the passage therethrough of a valve stem 31. The outer end of the bore 30 is enlarged and threaded for the reception of a packing element 32, a gland nut 33 providing a means for compressing the same. The plug between its outer end 34 and the outer end of bore 30 is provided with an

opening 35 therethrough in order that the gland nut may be operated to compress the packing.

The inner end of the valve rod 31 is threaded for the reception of a conical valve 36 to seat within the conical bore 23 of the tube 20, the valve being held against rotation by the lock nut 37.

In order that the operators may readily adjust the valve 36 for a desired rate of flow, a gauge or scale 38 is secured to the plug 29 at the opening 35, the lower edge 39 of the gauge plate having suitable graduated marks thereon, the graduations indicating the area of the opening in the flow nipple. Secured to the valve stem 31 by a pin 40 within the opening 35 of the plug 29 is a collar 41, provided with a V-shaped flange 42 that registers with the graduation on the gauge plate when the valve stem is rotated.

From the above it will be clear that the rate of all flow from a well may be quickly and easily adjusted through the medium of the flow nipples. When the nipples have been assembled, the valve stems 31 are rotated to unseat the conical valves 36, the gate valves 13, 14, being closed. As the well begins to flow either one or both of the valves are opened, the operator rotating the valves 36, of the flow nipples until the desired rate of oil flow is attained, when the clamping nuts 43 are operated to lock the stems 31 in their adjusted positions.

What I claim is:

1. A flow nipple including a valve body having an extended contracted inlet and an extended flaring outlet, a valve adapted to be seated in the outlet, said valve having a tapered portion, the taper of said portion being less than the taper of the outlet, whereby a passage is formed between said valve and said outlet.

2. A flow nipple comprising a body member provided with a contracted inlet and a flaring outlet and having a straight portion therebetween, a conical valve in said body member, the taper on the valve being less than the taper of the body portion in which it is seated whereby a fluid opening of regulatable area is formed between the valve and the surrounding body portion, and means for indicating the area of the opening.

3. A flow nipple including a valve body having a contracted inlet and a flaring outlet with a straight portion therebetween, and a valve having a tapered portion adapted to be seated in the outlet, the taper of said valve portion being less than the taper of the outlet.

4. A flow nipple including a valve body having a tapered inlet and outlet with a straight portion therebetween, the areas of the inlet opening and the outlet discharge being substantially that of the flow line and a valve having a tapered portion adapted to be seated in the outlet.

In witness that I claim the foregoing I have hereunto subscribed my name this 22nd day of June, 1926.

WILLIAM D. SHAFFER.