(No Model.)

R. EAGAN.

FLOWING OIL WELL.

No. 249,231. Patented Nov. 8, 1881.

Fig. 1.

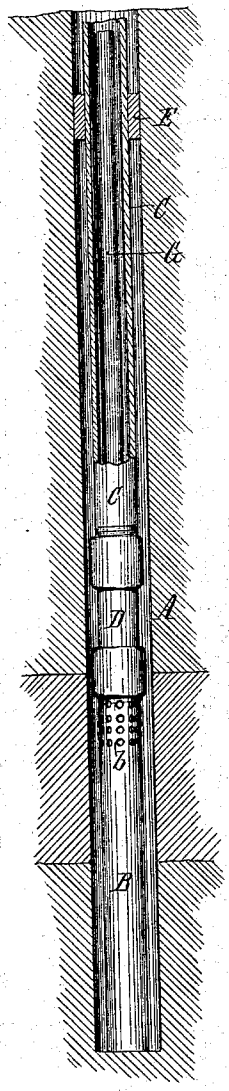


Fig. 2.

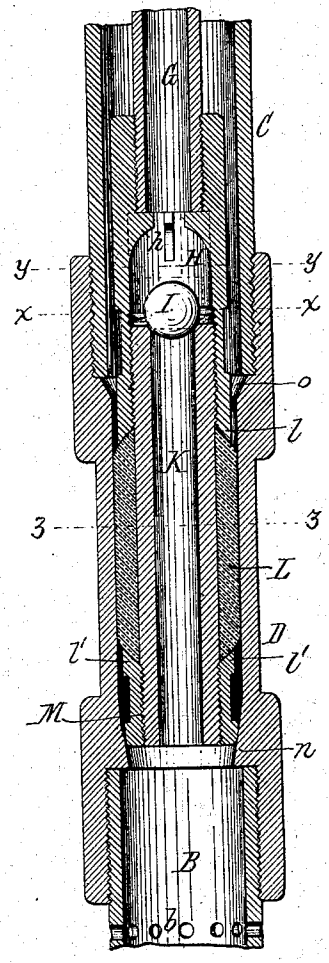


Fig. 3.

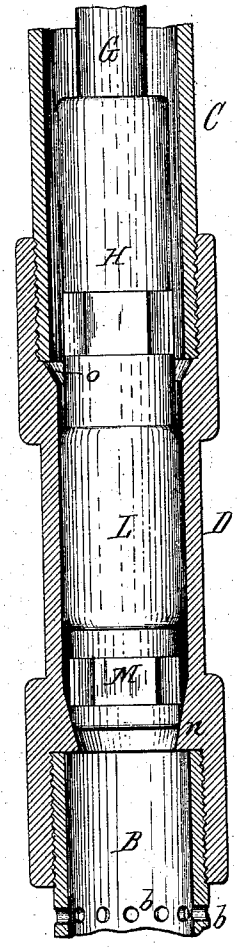


Fig. 4.

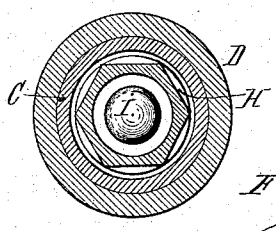


Fig. 5.

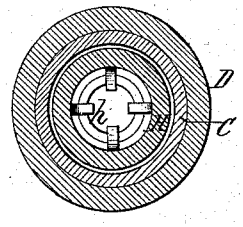
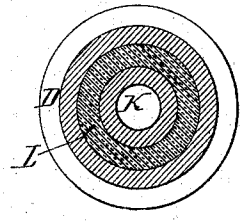


Fig. 6.



Inventor:
Richard Eagan.
By Wilhelm & Bonner.
Attorneys.

Chas. J. Buechheit.
Aug. L. Esenwein.
Witnesses.

N. PETERS, Photo-Lithographer, Washington, D. C.

UNITED STATES PATENT OFFICE.

RICHARD EAGAN, OF BRADFORD, PENNSYLVANIA.

FLOWING OIL-WELL.

SPECIFICATION forming part of Letters Patent No. 249,231, dated November 8, 1881.

Application filed August 20, 1881. (No model.)

To all whom it may concern:

Be it known that I, RICHARD EAGAN, of Bradford, in the county of McKean and State of Pennsylvania, have invented new and useful Improvements in Flowing Oil-Wells, of which the following is a specification.

This invention relates to that class of oil-wells in which the oil is driven up through the well-tubing by the pressure of the gas in the oil-bearing stratum of sand.

In this class of wells the flow of oil is frequently reduced to a very considerable extent, or entirely suspended, by the accumulation of water in the well and tubing when the gas-pressure is insufficient to expel this water from the tubing. As the water accumulates in the well it closes the seams of the oil-bearing sand, thereby gradually reducing the gas-pressure in the well until the pressure ceases to be sufficient to elevate the oil to the surface, when the well stops flowing.

The object of my invention is to construct the tubing of flowing wells in such manner that the gas-pressure in the well is applied in the most effective manner and the water prevented from accumulating in the well, thereby increasing the flowing capacity of the well and preventing interruptions in its operation.

My invention consists, first, in combining with the inlet through which the oil is admitted into the tubing from the well a contracted flow-pipe and a check-valve arranged in the lower portion of the flow-pipe to prevent the return of the liquid from the flow-pipe into the well, thereby increasing the gas-pressure upon the liquid in the flow-pipe and avoiding the accumulation of water in the well; also, of the particular construction of the check-valve and of the parts by which the flow-pipe is connected with the tubing, as will be hereinafter fully set forth.

In the accompanying drawings, Figure 1 is a partly sectional elevation of an oil-well provided with my improvements. Fig. 2 is a vertical section of the lower part of the flow-pipe and the adjacent portion of the tubing. Fig. 3 is an elevation of the lower part of the flow-pipe, with the adjacent portion of the tubing in section. Figs. 4, 5, and 6 are horizontal sections in lines *x x*, *y y*, and *z z*, Fig. 2, respectively.

Like letters of reference refer to like parts in the several figures.

A represents the bore of the oil-well, and B the lower portion of the tubing resting on the bottom of the well, and provided near its upper end, opposite the oil-bearing sand, with perforations *b*, in the usual manner.

C represents the upper portion of the well-tubing, extending to the surface of the ground, and D is a cast sleeve, which connects the two portions B and C of the tubing.

E represents a packing, of any well-known construction, applied to the outer side of the tubing C, above the oil-bearing sand, in the usual manner.

G represents the contracted flow-pipe arranged within the upper tubing, C, and having preferably a diameter of about one inch in the clear, the tubing C being ordinarily about two inches in the clear. The lower end of the flow-pipe G is attached to a sleeve, H, arranged within the tubing C and containing the check-valve I. The latter is seated upon the upper end of a tube, K, which is attached to the lower end of the sleeve H, and extends downward therefrom. The sleeve H is provided above the valve I with several inwardly-projecting teeth or stops, *h*, which limit the upward movement of the valve, and have openings between them for the passage of the liquid into the flow-pipe G, the sides of the chamber in which the valve I plays being imperforate.

The tube K is surrounded by a packing-ring, L, of india-rubber or other suitable material, which is held on the tube between two undercut shoulders, *l l'*, the shoulder *l* being formed in the lower end of the sleeve H, to which the upper end of the tube K is attached, and the shoulder *l'* being formed in the upper end of a collar, M, which is attached to the lower end of the tube K. The parts are connected together by screw-threads, as shown in the drawings. The lower end of the collar M is rounded and fits in a slightly-tapering portion, *n*, of the bore of the sleeve D, in which it seats itself tightly when the flow-pipe has reached its proper place. The packing-ring L projects slightly beyond the peripheries of the sleeve H and collar M, and its external diameter is slightly larger than the bore of the sleeve D,

which bore is made slightly flaring at its upper end, as shown at *o*, in order to compress the packing-ring as the flow-pipe is lowered, and cause a tight fit of the packing in the bore of the sleeve D. The tube K is preferably constructed of steel. The oil, entering the lower tubing, B, through the perforation *b*, is driven upward through the tube K, and, after lifting the valve I, passes through the openings between the valve stops *h* into the flow-pipe G. The latter and the tube K are much smaller in area than the tubing B, and the gas-pressure, acting upon this smaller area, is therefore better able to lift the column of liquid in the flow-pipe. If, from any cause, the flow of liquid through the flow-pipe G is so much retarded that the water mixed with the oil in the flow-pipe tends to work to the bottom, the check-valve I closes and prevents the water in the flow-pipe from returning to the well. In this manner the accumulation of water in wells which are deficient in gas-pressure is avoided, and a steady flow of oil is obtained from wells which would otherwise entirely fail to flow. The liquid is but slightly deflected from its upward course in passing through the chamber in which the valve I is arranged, whereby the resistance which the valve offers to the passage of the liquid is reduced to a minimum.

I am aware that contracted flow-pipes have been employed in flowing wells for the purpose of increasing the effect of the gas-pressure upon the oil, and that in connection with such contracted flow-pipes, packers and casing have been used, which prevent the water from flowing into the well from above the packer, and the escape of gas from the well, except through the contracted flow-pipe, and this I do not claim; but

I claim as my invention—

1. In a flowing well, the combination, with the inlet-tubing B *b*, of the contracted flow-pipe G K, and a check-valve, I, arranged in the lower portion of the flow-pipe, whereby an increased effect of the gas-pressure upon the liquid in the flow-pipe is produced and the accumulation of water in the well is prevented, substantially as set forth.

2. In a flowing well, the combination, with the inlet-tubing B *b*, upper tubing, C, and sleeve D, of the contracted flow-pipe G, sleeve H, check-valve I, and tube K, substantially as set forth.

3. The combination, with the inlet-tubing B *b*, upper tubing, C, and sleeve D, of the contracted flow-pipe G, sleeve H, tube K, collar M, and packing-ring L, surrounding the tube K between the sleeve H and collar M, substantially as set forth.

4. The combination, with the sleeve D, having its bore provided with a lower contracted conical portion, *n*, of a flow-tube, K, provided with a cap, M, adapted to seat itself in the conical portion *n* of the bore, substantially as set forth.

5. The combination, with the sleeve D, having its bore constructed with an upper flaring portion, *o*, of a flow-pipe, G K, provided with a packing-ring, L, adapted to be compressed by the conical portion *o* of the bore, substantially as set forth.

6. The combination, with the sleeve D, having a bore provided with conical portions *n o*, of a flow-pipe, G K, provided with a packing-ring, L, and cap M, substantially as and for the purpose set forth.

7. The combination, with the valve I, of the sleeve H, having imperforate side walls, and provided with stops *h* above the valve I, having openings between them for the passage of the liquid, substantially as set forth.

RICHARD EAGAN.

Witnesses:
JNO. J. BONNER,
EDW. J. BRADY.