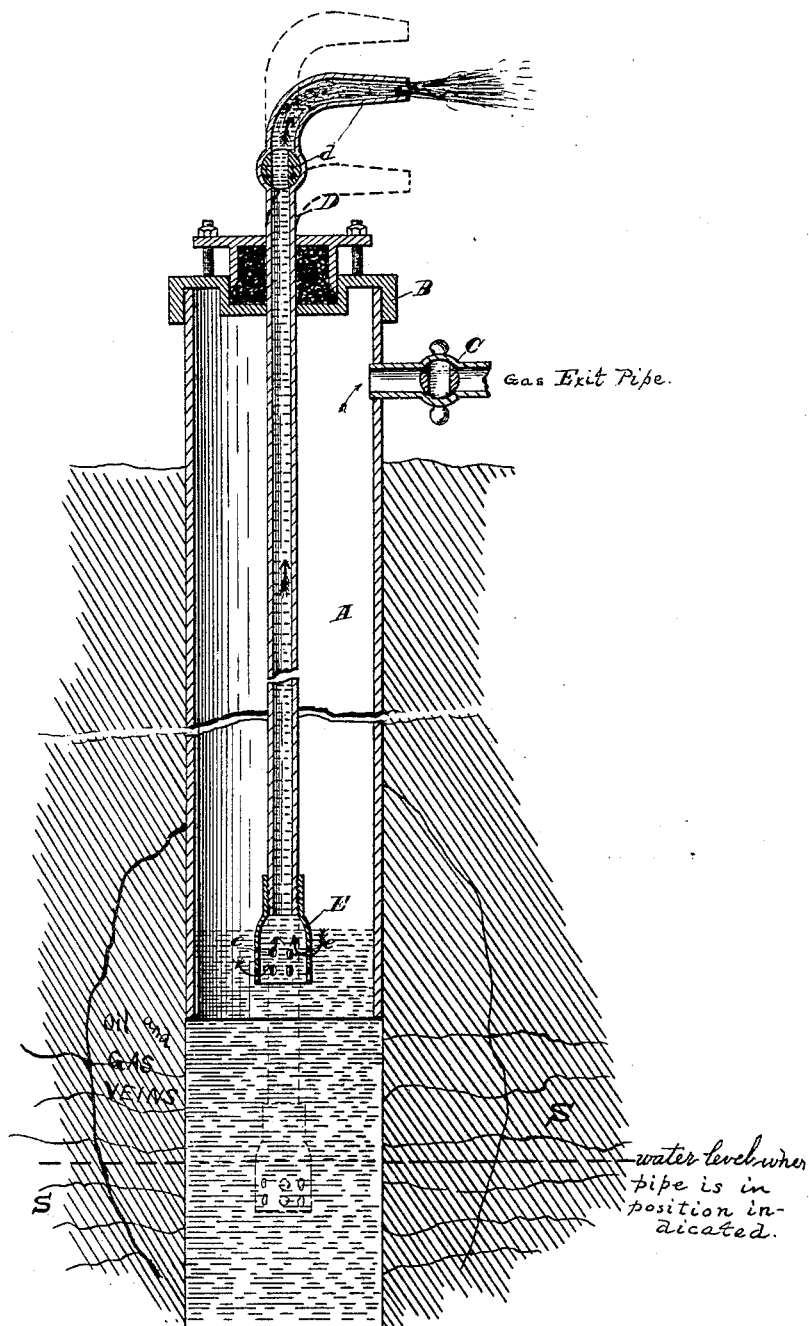


(No Model.)

J. HEED.
MEANS FOR AND METHOD OF BLOWING OFF FLUIDS FROM OIL OR
GAS WELLS.

No. 454,432.

Patented June 16, 1891.



WITNESSES

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JACOB HEED, OF BARNESVILLE, OHIO, ASSIGNOR OF ONE-HALF TO FRANCIS W. HIBBARD, OF SAME PLACE.

MEANS FOR AND METHOD OF BLOWING OFF FLUIDS FROM OIL OR GAS WELLS.

SPECIFICATION forming part of Letters Patent No. 454,432, dated June 16, 1891.

Application filed February 19, 1891. Serial No. 382,022. (No model.)

To all whom it may concern:

Be it known that I, JACOB HEED, of Barnesville, in the county of Belmont and State of Ohio, have invented certain new and useful
5 Improvements in Means for and Method of Blowing Off Fluids from Oil or Gas Wells; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and
10 to the letters of reference marked thereon, which form part of this specification, in which, the drawing represents in vertical section my improved means for clearing gas or oil wells of fluids.

15 My invention has especial reference to means for removing fluids from gas-wells or oil-wells wherein a natural gas-pressure exists by utilizing this natural pressure of gas in connection with simple mechanical means
20 to flow the fluid or drive it from the well, as will be clearly understood from the following description and claims.

In the drawing, A indicates the casing of the well; B, the casing-head secured gas-
25 tightly thereto; C, the gas-discharge pipe; S, the gas or oil veins, from which the gases escape into the casing. Along with the gases thus escaping into the casing, water, petroleum, and other fluids generally enter and gradu-
30 ally collect therein. In gas-wells the fluid as it collects shuts off the inflow of gas, thus diminishing the yield of the well, and it is necessary to remove the fluid. Through the casing-head B, I insert a pipe D, which plays
35 through a suitable stuffing-box in the head, or is so connected thereto that, while the pipe can be raised or lowered vertically through the head, the gas in the casing cannot escape therefrom beside the pipe. The pipe D may
40 be made in sections, so that it can be adjusted to various depths in the well, according to the height of the fluid therein, and on the lower end of this pipe is secured a tubular mouth-
45 piece E, of larger diameter than the pipe and having a series of lateral perforations *ee* in its lower end, as indicated in the drawing. Pipe D may be raised or lowered by any suit-
50 able means, (not shown), such as a bull-wheel or crane and derrick, or it may be screw-threaded, and the opening in the casing-head may be similarly threaded, so that pipe D may

be screwed up or down. The upper part of pipe D is provided with a nozzle and stop-
cock *d*, so that the escape of fluid or gases therethrough can be regulated or cut off. 55
Now when fluid collects in the well to such depth as may impair the gas yield thereof pipe D is adjusted until the perforated end of mouth-piece E is a few inches below the surface
60 of the fluid. Then cock *d* is opened and the gas in the casing seeking to escape through pipe D necessarily forces the fluid into mouth-piece E through the perforations therein, creating
65 a violent ebullition of the fluids and gases in the mouth-piece and pipe and driving the fluid up through pipe D out of the well. The
fluid, being thus mixed with the gas in pipe D, is expanded in bulk and lightened, and
70 thus is more easily forced out with comparatively little pressure of gas. As the fluid is withdrawn in this manner, the attendant
lowers pipe D, so as to keep piece E always a few inches only below the surface of the
75 fluid, and by this means the entire volume of fluid can be driven out and the gas or oil bearing strata uncovered.

It will be observed that by my invention the casing does not have to be uncovered, no pumps are used, and I simply utilize the natural pressure of the gases to flow the oil. 80
It is essential, however, that the mouth-piece be kept near the surface of the fluid. The operator can tell at once if the fluid falls below the mouth-piece, for the fluid would cease
85 flowing, and then he lowers the pipe until the gasified fluid is again blowing out. If the end of pipe be too much below the surface, the gas cannot escape into the mouth-piece, and hence the flow will stop. The gases rising
90 through the fluid in the well naturally expand as they near the surface thereof, so that the upper portion of the fluid is more expanded, and is consequently lighter in proportion to its bulk, than its lower portion.
95 Again, the confined gases above the fluid naturally permeate the surface part thereof, so that if any outlet be provided near the surface of the fluid the gases seek such outlet, and in their course carry portions of the fluid
100 into the pipe. I take advantage of these natural conditions and properties of the expanded fluid and gases and provide an outlet

for the lightest portions thereof by adjusting the flow-pipe in the manner described, so that its lower end shall be near the surface of the fluid, and as the latter escapes through the pipe and the fluid-level falls I lower the pipe gradually and in accordance with the fall of the fluid-level, and the nearer the surface the end of flow-pipe is kept the less will be the exterior pressure necessary to raise the fluid therein. If the end of pipe be submerged so far below the surface that the gas cannot escape into it with the fluid, it is apparent that the fluid will not flow or be forced out, except by an immense gas-pressure, and in deep wells this pressure is not attainable, because the pressure must be sufficient to lift a column of fluid in the pipe bodily. Hence resort has been had to various appliances and methods for raising the fluid, such as pumps for lifting the oil direct or by artificially increasing the pressure of gas by forcing air into the casing above the fluid, and by ejecting air and steam directly into the flow-pipe, all of which require costly apparatus for operating them and are generally inefficient. By my invention a low pressure of gas will effect the flowing of the fluid, and I have actually cleared a well of fifteen feet of water by proceeding in the manner above stated.

The enlarged mouth-piece E constitutes an aerating or expansion chamber for the fluid. The oil is forced therein through the perforations in the wall thereof by the gases, and in passing through the perforations is divided into minute streams and broken up, and thereby gases liberated and the body of fluid in the chamber and entering therein is frothed or bubbled and expanded by the gases, and thus lightened in specific gravity and the more readily raised and ejected through the pipe. The escape of the expanded oil from the mouth-piece into the pipe being much less in area than the oil and gas entrances into the mouth-piece, the oil is more forcibly carried upward through the pipe than it would be if it were equal in diameter to the mouth-piece.

I am aware, in addition to what has been above stated, that packing has been placed around the exit-pipe at different heights in the well, so as to confine the gases nearer the oil-bearing strata, and that the gases and air have been ejected into the stand-pipe at various points, so as to expand the oil therein and

assist in raising it therethrough; but I do not claim, broadly, the feature of expanding the oil. My invention relates more especially to the fact that by my apparatus or peculiar manipulation of the stand-pipe itself, so as to maintain its lower end just below the surface of the fluid, I without the employment of any auxiliary or supplemental ejectors, condensers, or force pipes or valves am enabled effectively to flow the well or drain it; and therefore,

Having described my invention, what I claim as new is—

1. The herein-described means for removing fluids from oil or gas wells by the action of and in conjunction with the combined gases therein, consisting of a single vertically-adjustable flow-pipe having an enlarged mouth-piece on its lower end and so adjusted, substantially in the manner described, that said mouth-piece shall be always kept near the surface of the fluid, whereby an ebullition of the fluid and gases in the mouth-piece is produced and the fluid raised in the pipe, substantially as and for the purpose specified.

2. The combination of the casing and the gas-tight casing-head for confining gases therein with a vertically-adjustable pipe playing through said casing, having a stop-cock on its outer end and an enlarged tubular and perforated mouth-piece on its lower end, whereby said mouth-piece may be always kept near the surface of the fluid, all constructed and arranged to operate substantially as described.

3. The method of raising fluid in gas or oil wells, consisting in confining the gases in the well above the fluid, then adjusting the flow-pipe in the well so that its lower end enters the upper or lighter surface portion of the fluid, and then shifting said pipe according to and with the variations in level of the fluid, so that the lower end of said pipe shall be always kept just below and near to the surface thereof, substantially as and for the purpose set forth.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

JACOB HEED.

Witnesses:

CHARLES T. HUNT,
WILLIAM H. BROWN.