

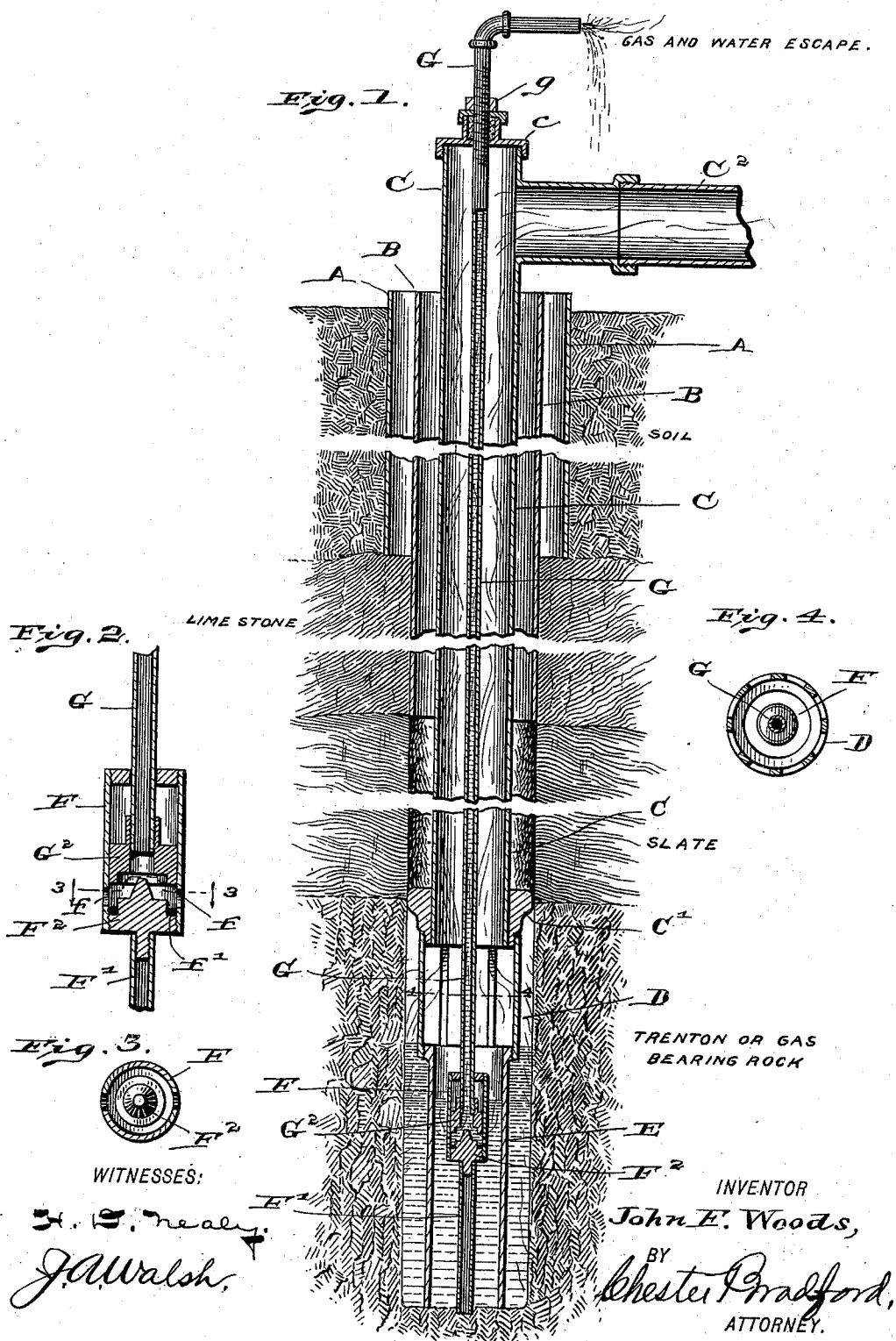
(No Model.)

J. F. WOODS.

APPARATUS FOR DISCHARGING LIQUIDS FROM GAS WELLS.

No. 535,569.

Patented Mar. 12, 1895.



UNITED STATES PATENT OFFICE.

JOHN F. WOODS, OF NOBLESVILLE, INDIANA.

APPARATUS FOR DISCHARGING LIQUIDS FROM GAS-WELLS.

SPECIFICATION forming part of Letters Patent No. 535,569, dated March 12, 1895.

Application filed December 13, 1894. Serial No. 531,671. (No model.)

To all whom it may concern:

Be it known that I, JOHN F. WOODS, a citizen of the United States, residing at Noblesville, in the county of Hamilton and State of Indiana, have invented certain new and useful Improvements in Apparatus for Discharging Liquids from Gas-Wells, of which the following is a specification.

My invention relates to that class of apparatus whereby by the use of a small portion of the gas of a natural gas well the water which ordinarily flows into such a well may be forced out of it, and said water thus kept below that point where the main flow of gas enters the well.

Said invention is based upon the fact that, in order to be successful, such an apparatus must be proportioned to the work it is called upon to perform—that is, the discharge orifice for the water, as impelled by the small quantity of gas, must be proportioned to the inflow of water from the surrounding strata.

An apparatus embodying my said invention will be first fully described, and the novel features thereof then pointed out in the claims.

Referring to the accompanying drawings, which are made a part hereof, and on which similar letters of reference indicate similar parts, Figure 1 is a central sectional view of a gas well, in fragments, showing portions of the various strata from the top to the bottom of the well, and showing the extreme top and bottom portions in full;—the intermediate portions being only the usual piping and boring; Fig. 2, a detail sectional view of the valve structure and immediately adjacent parts on a somewhat larger scale; Fig. 3, a detail sectional view on the dotted line 3 3 in Fig. 2, and Fig. 4 a detail sectional view on the dotted line 4 4 in Fig. 1.

In said drawings the portions marked A represent the outer pipe or casing, which is commonly driven, in boring such wells, through the soil to the upper surface of the limestone strata; B, a second or inner casing, which is usually driven to the bottom of the limestone; C, the well proper or gas pipe, which, in my improved apparatus, commonly extends to within the upper edge of the gas bearing rock, at which point the well is provided with a packing C' surrounding said pipe; D, a cage,

shown as a perforated or slitted cylinder, extending downwardly a short distance below the lower end of the pipe C, into which the gas and water may freely flow; E, a closed pipe (of similar size to the pipe C) extending from the perforated or slitted cylinder D to the bottom of the well; F, a valve cylinder within the pipe E, preferably located a short distance below its top, and G a small pipe or tube leading from the valve in the cylinder F out through the top of the well.

The pipes A and B are similar in form and arrangement to corresponding pipes already in use, and the pipe C is also in the main similar, and has the usual gas main C² connected thereto at its top below the cap c thereon. The slotted or perforated cylinder D has already been described, and is simply for the admission of the water and gas which flow in from the surrounding strata. The bottom of the well, as shown in Fig. 1, is always filled with water to the bottom of this cylinder, and such water runs in through the slots and perforations to within the pipe E, which said pipe E is a solid pipe, without perforations, and extends to the bottom of the well, as shown.

The cylinder F, which contains the valve, is tightly closed at the top and bottom, and is supported by a standard F' running to and resting upon the bottom of the well. Within the bottom of said cylinder and resting upon said standard is a preferably solid block-like structure F², which both closes the bottom of the cylinder and forms a valve seat therein, and just above said part F² are small perforations f through the walls of the cylinder F.

The pipe G is a small pipe, and extends from the top of the well down to within the cylinder F, being supported at the top by a nut g which engages with an exterior screw thread cut upon that portion of it; and there is also a stuffing box, in or upon the well cap c through which said pipe passes, to prevent the escape of gas, as is plainly shown in Fig. 1. Upon the lower end of the pipe G is a movable valve portion G², arranged above the portion F², and the faces of these two portions are formed so that when they come together they may operate as a valve to either entirely or partially close the flow of fluid through said valve. As will be readily understood,

this can be easily regulated from the top by revolving the pipe G in its nut g, and thus cause the part G² to approach to or recede from the part F². The orifice may thus be
 5 exactly regulated to the requirement of the well, so that it will just discharge the quantity of water which flows into said well, and keep it at all times in the required condition. Manifestly, if the orifice is too large, so that
 10 more water might be blown out through it than actually enters, an undue proportion of gas will go with it, and the gas thus be wasted, besides reducing the pressure in the main gas pipe. If it is too small, manifestly the water
 15 will accumulate and soon drown out the well. My invention is, therefore, not only simple and easily operated, but is of much value in the practical operation of gas wells. The valve structure is shown with two seats, but,
 20 while this is desirable, as providing a greater security when the valve is closed, it is manifestly not essential to the operation. In the lower seat I have placed a rubber ring f², as shown, to insure tight fitting at this point.
 25 Having thus fully described my said invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination, in a gas well, of the ordinary gas pipe, a packing thereto at or near

the upper portion of the gas bearing strata, 30
 an open-sided or slitted or perforated cylinder below the packing, a close-sided tube extending from said cylinder toward the bottom of the well, a valve within said close-sided tube, and a small pipe leading from said valve to 35
 the top of the well and carrying the adjustable portion of the valve, said pipe being also adjustable, substantially as shown and described.

2. The combination, in a gas well, of the ordinary gas pipe, the packing thereto at or near the upper portion of the gas bearing strata, a small central water discharge pipe extending to below the packing and to below the lower end of said ordinary gas pipe, a valve 45
 casing carrying one portion of a valve positioned at the lower end of said water discharging pipe, and the other valve portion attached to said water discharging pipe, substantially as and for the purposes set forth. 50

In witness whereof I have hereunto set my hand and seal, at Indianapolis, Indiana, this 10th day of December, A. D. 1894.

JOHN F. WOODS. [L. S.]

Witnesses:

H. D. NEALY,
 JAMES A. WALSH.