

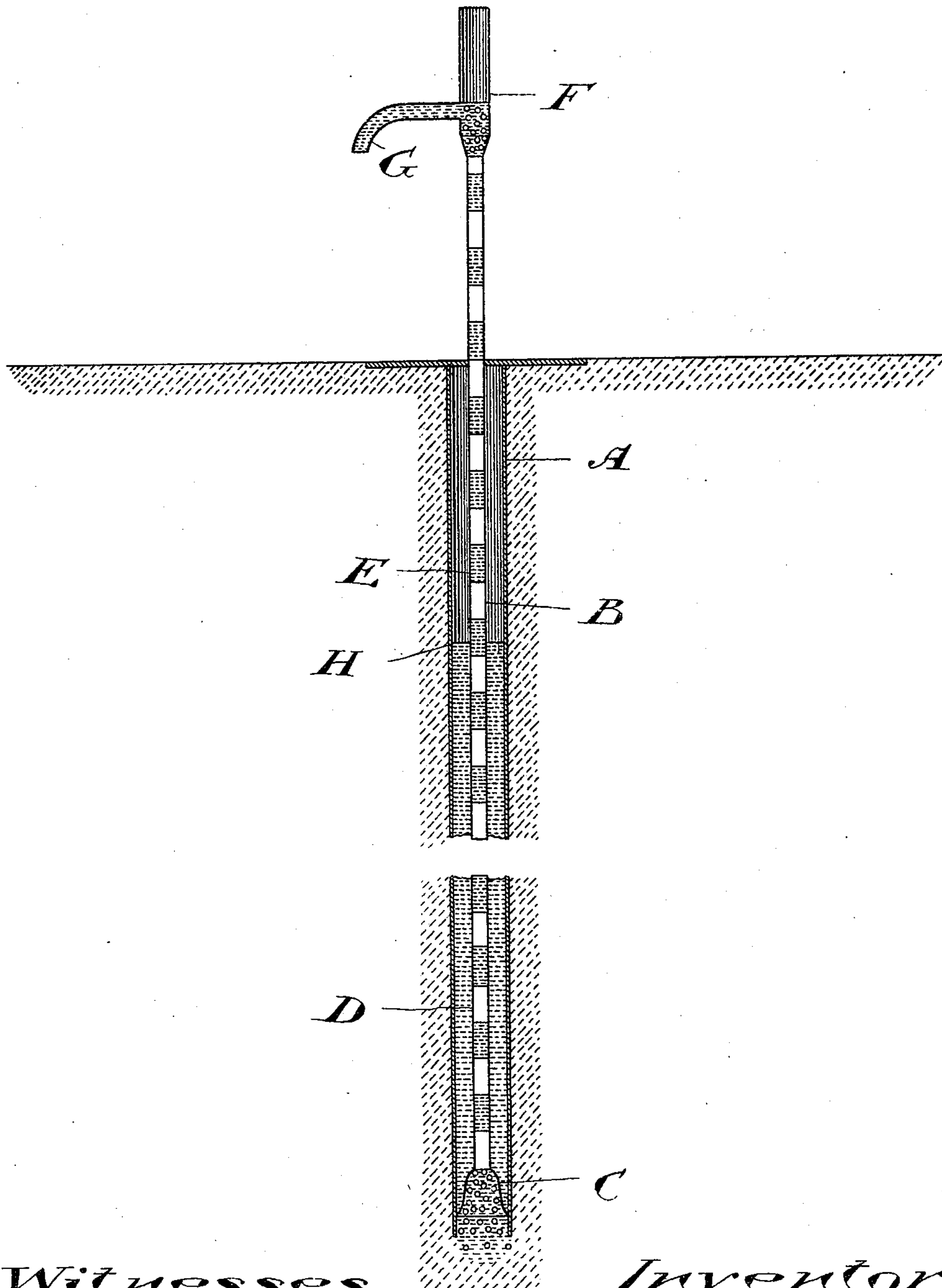
(No Model.)

B. KERR.

AUTOMATIC APPARATUS FOR ELEVATING LIQUIDS.

No. 566,987.

Patented Sept. 1, 1896.



Witnesses

J. M. Neff,
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Inventor

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UNITED STATES PATENT OFFICE.

BENJAMIN KERR, OF TORONTO, CANADA, ASSIGNOR TO ANNIE KERR,
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AUTOMATIC APPARATUS FOR ELEVATING LIQUIDS.

SPECIFICATION forming part of Letters Patent No. 566,987, dated September 1, 1896.

Application filed January 21, 1895. Renewed January 25, 1896. Serial No. 576,892. (No model.)

To all whom it may concern:

Be it known that I, BENJAMIN KERR, mechanic, of the city of Toronto, in the county of York and Province of Ontario, Canada, have invented an Automatic Apparatus for Elevating Liquids, of which the following is a specification.

The object of the invention is to provide an apparatus which may be capable of raising water, oil, brine, &c., automatically by utilizing the force supplied by the natural gas contained in the body of the earth; and it consists, essentially, of an ejecting tube or pipe provided at its lower end with a bell-shaped mouth or concentrator which is to be immersed in the gas-charged water and to approximately fill the outer casing, so as to intercept the gas and direct it, together with the gas-charged water, into the interior of the ejecting-pipe, in which it is raised and discharged above the surface of the earth, as hereinafter specified.

The drawing is a sectional view of the apparatus.

In the drawing, A is the outer casing of a well, which may be made either of wood or iron, and is usually of a round or octagonal shape. This casing of course is sunk in the usual way through the strata of the earth to reach the stratum which contains the gas-charged liquid below the surface, whether it be water, oil, brine, &c.

B is a metal ejecting-pipe, which is usually of about one-half inch in interior diameter. At the lower end of this pipe there is formed an enlargement or concentrator C, which is preferably bell-shaped, but may be funnel-shaped or square at the bottom, or any other shape which may be deemed convenient, provided that it is of such size and shape as to direct the gas and the gas-charged water up to the interior of the ejecting-pipe B. This bell-shaped concentrator is of such a size as to approximately fill the area of the outer casing A, so as to prevent any undue flow of gas outside of the ejecting-pipe. It is of course to be adapted in size and shape to the casing A of the well within which it is desired to operate.

In the drawing, the pipe B is shown charged with alternate layers or bubbles of gas D and

layers of water E. It is in this way that the water is carried up through the ejecting-pipe by the gas and discharged at the discharge-spout G.

The upper end of the ejecting-pipe B is enlarged at F, commencing at a point immediately below the discharge-spout and extending upward for a few feet above the same. The upper end of this enlarged end F is opened so as to permit all free gas which may not be absorbed or taken up by the water to escape straight upward into the open air, while the water passes through the discharge-spout G, as mentioned. The natural surface of the water-level outside of the ejecting-pipe B is shown at H, the ejecting-pipe B being submerged below this natural-surface water-line H to a sufficient distance to regulate or determine the flow of water upward through the ejecting-pipe, as hereinafter more particularly referred to.

The operation is as follows: As the gas rises in the concentrator it carries through the ejecting-pipe layers or bubbles of water, portions of gas, and gas-charged water, alternating with each other, as indicated in the drawing. The gas, owing to its flow and small specific gravity, lifts or forces the water up through the ejecting-pipe, from whence it is discharged from the discharge-spout, the free gas escaping at the top of the enlarged end of the pipe into the air. At all times, in order to insure the constant flow of water, there must be sufficient gas within the pipe to reduce the pressure or weight of the water at the bottom of the pipe to less than the normal pressure outside and in the concentrator.

My apparatus is adapted to work in any size of well-casing, provided that the concentrator or bell-shaped enlargement approximately fills the casing, and the flow and height to the point of discharge to which the water is raised is regulated by the area or diameter of the ejecting-pipe and the depth to which it is submerged below the natural surface of the water. When, for instance, the diameter of the ejecting-pipe is one-half inch, the weight of the gas-charged water within the ejecting-pipe is calculated to be about two-fifths of the weight of a similar column of water outside of the ejecting-pipe at the in-

take, where this point is sixty feet below the natural surface of the level of the water outside. Consequently there would be sufficient force generated (being about 4.3 pounds to the square inch) to raise the water within the ejecting-pipe at a velocity of twenty-five feet per second and to discharge the same through this one-half-inch pipe at the rate of about three hundred and forty gallons per hour at a point about twenty feet above the natural surface of the water-level.

If it be desired to raise the water through the ejecting-pipe to a greater distance than twenty feet at the foregoing velocity of twenty-five feet per second, it will be necessary to decrease the diameter of the ejecting-pipe, or the same result as first mentioned may be arrived at with the half-inch ejecting-pipe by increasing the distance between the point of intake and the natural-surface level of the water.

Increasing or decreasing the area of the ejecting-pipe increases or decreases the specific gravity of the column of gas-charged water within the ejecting-pipe, provided the pressure of the gas remains the same.

What I claim as my invention is—

An automatic apparatus for raising liquids, comprising an ejecting-pipe with an enlargement at its lower end which approximately fills the outer casing, by means of which the natural gas contained in the earth may be utilized to raise the water through the ejecting-pipe, and discharge the same above the surface of the earth, substantially as described and specified.

Toronto, January 11, 1895.

BENJAMIN KERR.

In presence of—

A. M. NEFF,
FRED CLARKE.