

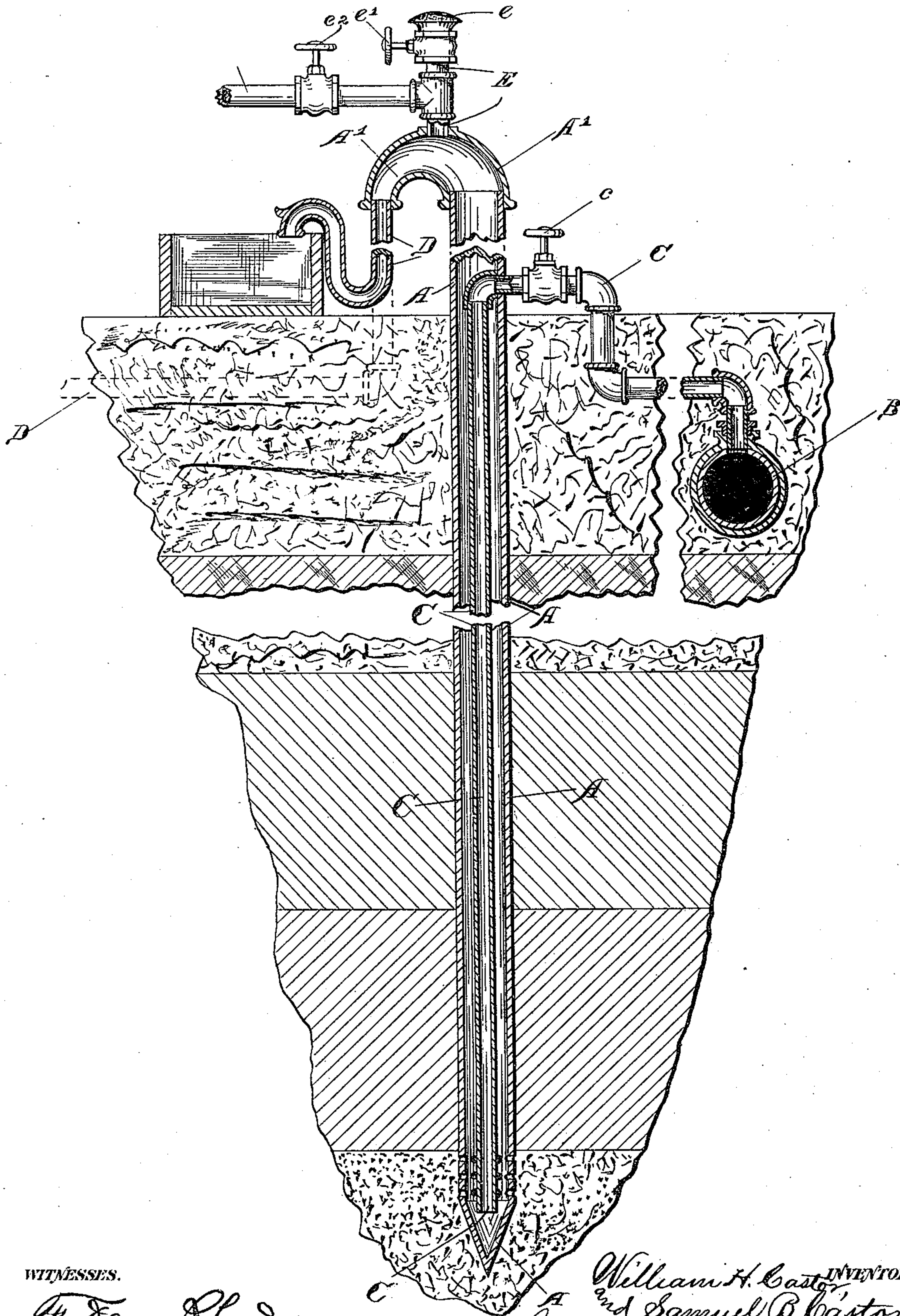
(No Model.)

W. H. & S. B. CASTOR.

APPARATUS FOR UTILIZING NATURAL GAS FOR RAISING WATER.

No. 441,056.

Patented Nov. 18, 1890.



WITNESSES.

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PER

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UNITED STATES PATENT OFFICE.

WILLIAM H. CASTOR AND SAMUEL B. CASTOR, OF NOBLESVILLE, INDIANA.

APPARATUS FOR UTILIZING NATURAL GAS FOR RAISING WATER.

SPECIFICATION forming part of Letters Patent No. 441,056, dated November 18, 1890.

Application filed June 10, 1890. Serial No. 354,902. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM H. CASTOR and SAMUEL B. CASTOR, citizens 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 Utilizing Natural Gas for Elevating Water, &c., of which the following is a specification.

As is well known, natural gas comes from wells or mains, within which it is confined under great pressure. It is also well known that the usual way of elevating water is by means of mechanical pumps operated by hand, steam, or other power. For farm purposes a common pump is usually employed adapted to be operated by hand-power, or in some cases by means of windmills or horse-power. For pumping water for mechanical purposes many different kinds of pumps are employed driven by engines of different characters or other power which may be convenient. The use of air under pump-pressure and of steam for ejecting water from a well are also well known expedients for the purpose. The value of natural gas for fuel purposes has long been well known, and in many instances it has been consumed in large quantities as a fuel for the purpose of generating the power used in driving machinery for pumping water. The gas of a character commonly present in oil-wells has also been utilized for the purpose of elevating the oil in the well in which it was found by closing the well above the surface of the oil, and thus confining the gas under the packing substance used to close the well, and directing its pressure against the surface of the oil beneath it, which pressure may be sufficient to force the oil out through a central discharge-pipe provided for the purpose. Natural gas has also been introduced against the surface of the oil in an air-tight casing for the purpose of securing sufficient pressure to eject said oil through a separate discharge-pipe extending to near the bottom of said casing, the gas being afterward allowed to escape through the top of said casing by the same pipe through which it has been admitted. Attempts have also been made to utilize natural gas in lieu of steam for driving an

engine, the gas being passed through the engine in the same manner as steam ordinarily is.

The object of our said invention is to provide an apparatus by which the pressure of natural gas may be utilized as it comes from the wells or mains leading therefrom for the purpose of elevating water or other fluid substances in distinct and separate wells, whereby the gas itself is utilized as the elevating power, instead of as a fuel to generate other power for elevating the water, as has been done heretofore.

This invention therefore consists in a peculiar arrangement of pipes and other parts by which natural gas is utilized to elevate water or other fluid substances, and, further, in the arrangement whereby said gas may then be used for any purpose for which it is adapted, as will be hereinafter more particularly described and claimed.

The process for elevating water which this apparatus is employed to accomplish forms the subject-matter of another application, Serial No. 324,449, filed by us on the 19th day of September, 1889.

The accompanying drawing, which is made a part hereof, and on which similar letters of reference indicate similar parts, represents a central vertical section through the upper and lower portions of a well and a pump or apparatus which forms the subject-matter of this application.

In said drawing, the portion marked A represents the well-tube; B, the gas-main; C, the gas-injector pipe; D, a pipe for the escape of the water, and E a pipe for the escape of the gas.

The well-tube A is represented as that of a driven well, being embedded closely in the ground. It may, however, be a tube extending into an open or dug well, or into any pit or excavation containing water, which it is desired to elevate or eject therefrom. Its top terminates in a discharge-pipe A', preferably of the form shown, being curved or semi-circular, and of a contracting diameter from its connection with the main well-tube to its opposite end, at which point a water-pipe or discharge-spout D is connected therewith.

The gas-main B is or may be any gas main or well which is most convenient to the well containing the fluid to be elevated.

The pipe C is connected at one end with the gas-main B and extends into and down the well-tube A to below the surface of the water therein, its lower end preferably extending to within or near the tapered bottom or point of said well-tube, as shown, this arrangement being preferable, as the tapering sides of the point thus serve to deflect the gas upwardly as it is discharged. A valve *c* is provided in said tube at a point convenient of access for the purpose of controlling the gas. In the use of the apparatus it will be found that a stream of water of any size desirable can be obtained by regulating this valve properly and admitting a large or small supply of gas, according to the size of the stream desired.

The water-pipe D is connected with the discharge end of the curved top A' of the well-tube, and may be formed into a spout for discharging water at the well into a tank, as shown; or it may be extended to a distant point, as indicated by dotted lines, to serve as a water-main, from which any number of branch pipes may extend, thus carrying the water to whatever place or places it is desired to have it discharged.

The gas-escape pipe E is connected with the top A' of the well-tube at the highest point in its curve, and may be open at its top or provided with a burner *e*, as shown in the drawing, or it may be closed and extended to whatever point desired, serving as a gas-main, from which smaller branch pipes may lead to where it is desired to use the gas; or, as shown in the drawing, these plans may be combined, the main pipe E being provided with a branch pipe E', extending to whatever place may be desired, a valve *e'* being provided beneath the burner *e* in the main pipe and a valve *e''* in the branch pipe E'. Thus when it is desired to pass the gas through the burner the valve *e''* is closed and valve *e'* opened, which will permit this operation. When, however, it is desired to pass the gas into the pipe or main E' to be consumed at some other place or places, the valve *e'* is closed and the valve *e''* is opened, which permits this result to be accomplished.

The operation of our said invention is as follows: A well-tube being equipped with an apparatus similar to that shown in the drawing, and it being desired to produce a stream of water, the valve *c* is opened, which permits the gas under pressure to rush down the pipe C to beneath the surface of the water and up the well-tube A, carrying the water along with it. As the gas and water turn into the top A' the natural buoyancy of the gas and the contracting form of the top A' serve to separate it from the water, which is carried down the pipe D by its gravity, and expels it through the opening in the top of said branch into the pipe E, where it is continued away

through the pipe E' for further use, or may be consumed at the burner *e*, as before described. The water, turning downwardly, passes into the pipe D and is discharged into a tank provided at the place or is conducted away to such places, as may be desired. As will be readily understood, the pipe D, being considerably smaller than the well-tube, the water readily fills it, and a steady and uniform stream is maintained continuously. Practical experiment has demonstrated that while gas is passing through the water in the elevating process it is considerably purified and rendered more valuable for illuminating purposes than when taken from the main direct. Thus by means of a very simple and inexpensive apparatus the gas is utilized to accomplish a very valuable result, avoiding the necessity of employing the expensive machinery, with the fuel and labor necessary to run it, which has heretofore been used for the purpose, and a steady and continual flow of water is obtained without impairing in any way the value of the gas for its ordinary uses, but rather benefiting and enriching it by the process. In the drawing, a break in the well-tube and discharge-pipe D is shown, indicating that said well-tube may be extended to any height desired. Thus when the well of water is at a distance from the point where it is desired to use the water the top of the well may be extended to a sufficient height to obtain the pressure necessary to force the water through the pipe D to the point desired; or in the event that it is desired to use the water in a spray-fountain, the pressure can be secured in this manner which will be sufficient to accomplish the purpose; or where it is desired to use water in several places—as, for instance, on a farm, it is sometimes desired to feed different tanks for watering stock, to feed a fish-pond and a fountain—then the pipe may be extended to a height necessary to obtain sufficient pressure for the purpose; the pipe D is made a water-main and tapped at various places, and small pipes are connected therewith, through which the water is conducted to the places desired. The gas-pipe E', as before indicated, may also be used as a gas-main and gas piped therefrom to the places where it is desired to use it, in the ordinary manner. Thus it will be seen that with but little expense all the advantages of artificial gas-works and a continual-flowing well or artificial water-works are readily secured in any district where natural gas exists.

Having thus fully described my said invention, what I claim as new, and desire to secure by Letters Patent, is—

1. An apparatus for elevating fluid substances, consisting of the well-tube, the natural-gas main or well, and a pipe leading from said natural-gas main or well to within said well-tube and extending to beneath the surface of the water therein, substantially as set forth.

2. An apparatus for elevating fluid sub-

stances, consisting of the well-tube containing the substance to be elevated, a natural-gas main or well, and a pipe leading from said natural-gas well or main to within said well-tube, said well-tube being formed with a curved top with a water-discharge below said top and a gas-discharge at said top, substantially as set forth.

3. The combination, in an apparatus for elevating fluid substances, of a well-tube extending to a considerable elevation above the ground and formed with a downwardly-extending water-discharge pipe and an aperture in its top, a natural-gas main or well, a pipe leading from said natural-gas main or well to within said well-tube and extending beneath the surface of the water therein, and a gas-pipe connected with the aperture in the top of said well-tube and leading therefrom, substantially as described, and for the purpose specified.

4. The combination, in an apparatus for elevating water, of the pipe through which the water is elevated and discharged from the well, a natural-gas main or well, and a pipe connected at one end of said natural-gas main, its other end extending through the pipe through which the water is to be elevated and to beneath the surface of the water therein, which pipe is provided with a valve for controlling the flow of gas, substantially as described, and for the purpose specified.

5. The combination of a tube A, extending into a supply of fluid substance at its lower end and provided with a discharge-spout at

its top; a natural-gas main B, a natural-gas injector C, connected with said gas-main and extending down the tube A to beneath the surface of the water therein and provided with a valve for regulating the flow of gas, and a pipe connected with the top of said discharge spout or pipe for conducting the gas therefrom as it separates from the water after being elevated, substantially as set forth.

6. The combination of a well-tube A, a gas-discharge pipe E, having a burner *e* on its top, and a valve *e'* beneath said burner, a branch pipe E', connected with said pipe E and provided with a valve *e''*, the gas-main, and the natural-gas-injector pipe C, connected with said gas-main and inserted in said well-tube A and provided with a valve *c*, substantially as set forth.

7. The combination of a well-tube A, the gas-main, a natural-gas-injector pipe C, extending from said gas-main to within said tube, the discharge end of said well-tube being contracted in size from its connection with the main well-tube to its discharge end, and a pipe E, connected to the top of said well-tube and extending to the place where it is desired to use the gas, substantially as set forth.

In witness whereof we have hereunto set our hands and seals at Indianapolis, Indiana, this 31st day of May, A. D. 1890.

WILLIAM H. CASTOR. [L. S.]

SAMUEL B. CASTOR. [L. S.]

Witnesses:

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CHESTER BRADFORD.