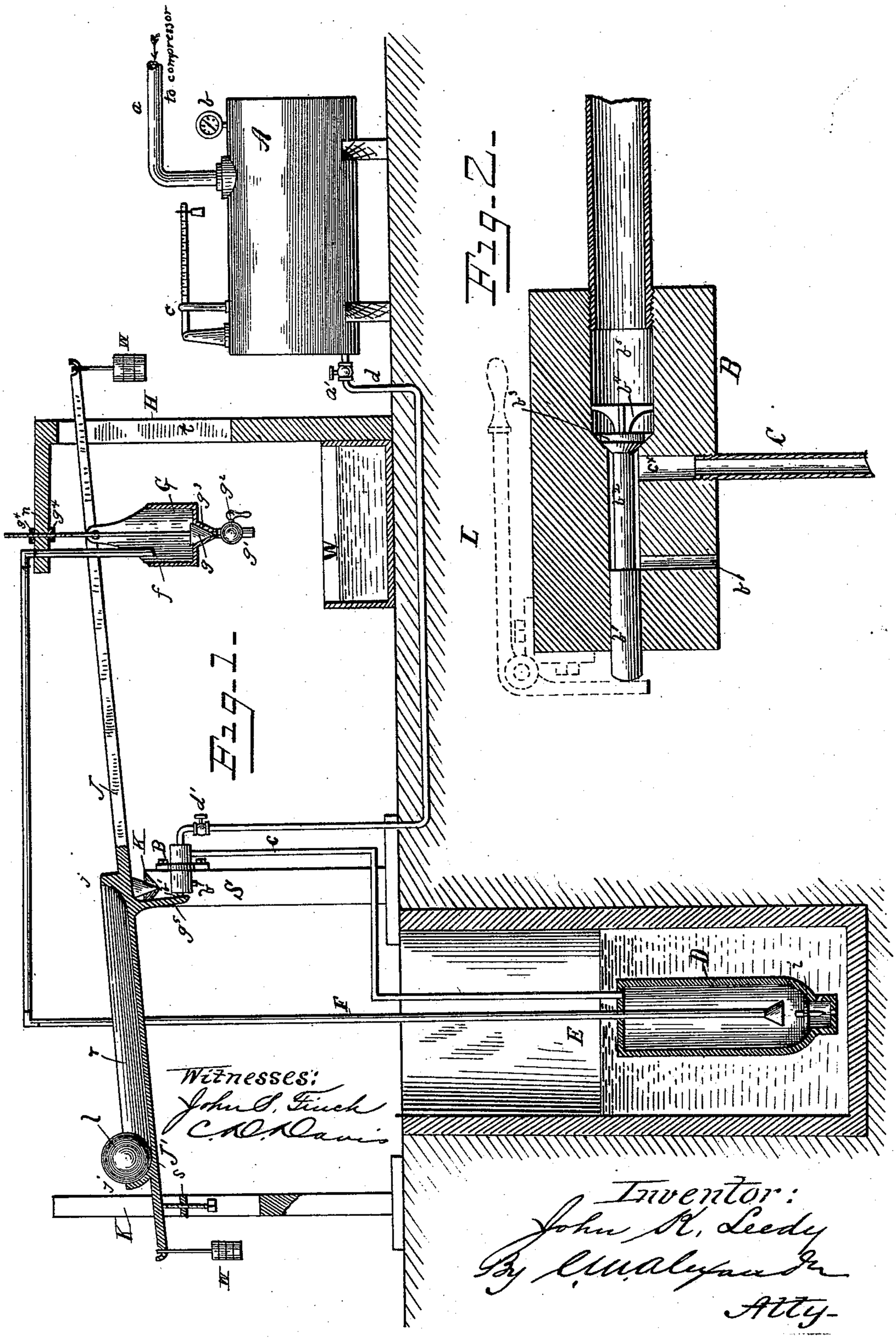
(No Model.)

J. K. LEEDY.

AUTOMATIC COMPRESSED AIR WATER ELEVATOR.

No. 396,405. Patented Jan. 22, 1889.



UNITED STATES PATENT OFFICE.

JOHN K. LEEDY, OF TOM'S BROOK, ASSIGNOR OF TWO-THIRDS TO NOAH W. SOLENBERGER AND GERMAN SMITH, OF WINCHESTER, VIRGINIA.

AUTOMATIC COMPRESSED-AIR WATER-ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 396,405, dated January 22, 1889.

Application filed December 8, 1887. Serial No. 257,338. (No model.)

To all whom it may concern:

Be it known that I, JOHN K. LEEDY, a citizen of the United States, residing at Tom's Brook, in the county of Shenandoah and State of Virginia, have invented certain new and useful Improvements in Automatic Compressed-Air Water-Elevators, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to certain new and useful improvements in automatic compressed-air water-elevators, which improvements will be fully understood from the following description and claims, when taken in connection with the annexed drawings, in which—

Figure 1 is an elevation, partly in section, showing my improved automatic compressed-air water-elevator, the parts being in a state of rest and the gravitating bucket being in position to receive water. Fig. 2 is an enlarged sectional view of the intermediate tripping-valve mechanism and its air-pipes, indicating by the aid of dotted lines a hand-lever which may be substituted for the working-beam and its toe, as represented in Fig. 1.

Referring to the annexed drawings by letter, A designates a strong vessel, which I shall hereinafter denominate the "air-storage vessel." This drum communicates, by means of a pipe, *a*, with a suitable air-forcing engine, adapted to compress air under great pressure into the said drum, which latter is provided with a gage, *b*, and a safety-valve, *c*. From the drum A leads off a pipe, *d*, provided with a regulating and cut-off cock, *a'*, which pipe leads into one end of a strong valve-box, B, and at *d'* is provided with another regulating-cock, if found necessary.

The valve-box B, into which the compressed-air-supply pipe *d* is tapped, has a chamber, b^5, terminated by a cone valve-seat for a cone trap-valve, b^3, which is provided with a spider-guide, b^4, working against the wall of chamber b^5. The valve b^3 is somewhat less in diameter than the diameter of the chamber b^5, and it is applied on the end of the reduced stem b^2 of a cylindrical plunger, *b'*, the outer end of which protrudes beyond the end of valve-box B, for a purpose presently explained. At $c^\times$ is a vertical outlet-passage through the valve-box, and at *b* is a similar passage. The passage $c^\times$ communicates, by means of a pipe, C, with a submerged drum, D, and the passage *b* is an outlet for air when the plunger *b'* is at the terminus of its outward stroke. (Indicated in Fig. 2.)

The drum D may be located at any practical depth in a well, E, and it should be provided at its bottom with a suitable valve, *i*, opening upwardly, for allowing water to flow through the valve-aperture into the said drum, but to trap the water therein. Near the lower end of said drum D is a bell-mouth connected to an outlet-pipe, F, which extends upward out of the well, and is curved, as shown in Fig. 1, and secured to the bracket-arm *n* of a standard, H, and terminates in a discharge-nozzle, *f*, directed downward. This discharge-nozzle *f* is located in such relation to a bucket, G, that it discharges water therein.

The bucket G is pivotally secured to one limb of a working-beam, J, which has a V-edge fulcrumed at *k* on a standard, S. The bottom of the bucket G is provided with an outlet-pipe, *g'*, having a regulating or cut-off valve, g^2, and a seat, g^3, which latter, when the bucket is at its highest point, is closed by a fixed valve, *g*. The stem g^3 of this valve *g* is vertically adjustable by means of nuts g^4, impinging against the bracket-arm *n* of the standard H, to which this valve-stem is secured. Directly beneath the outlet-pipe *g'* of the bucket G is a water-receptacle, W. (Shown clearly in Fig. 1 of the annexed drawings.)

The working beam or lever J can be nicely or properly adjusted to an equipoise by means of weights *w w*, hung from its extremities, and one limb of this beam is guided in a slot, *t*, in the standard H, while the opposite limb, J', is guided in the bifurcated upper part of a standard, K. This limb J' is constructed with a trough, *r*, adapted to afford a track for a shifting ball, *l*, which trough is turned up at its ends *j j'*, to prevent the said ball escaping from it at the termini of its strokes.

I apply in the vertical slot of the standard K an adjustable rest or stop, *s*, upon which is supported the arm J' of the vibrating beam J, when this beam is in the position shown in Fig. 1. (In close relation to the fulcrum of

the beam J and rigid therewith is an arm or toe, g^5, which, when the said beam is in the position indicated in Fig. 1, will press the plunger b' inward a sufficient distance to close the vent b and open the valve b^3, as will more fully hereinafter appear.)

The operation of the elevator is as follows: The storage-vessel A having been charged with air under considerable pressure, the cocks a' d' are opened more or less. Compressed air will now pass from the storage-vessel through pipe d and press upon the water in the submerged drum D, tightly closing check-valve i and forcing the water up through the pipe F and discharging it from the nozzle f into the vessel G on one arm of the beam J. When the weight of water in vessel G preponderates over the ball l, this vessel will descend, leaving the valve g and opening the outlet passage through the discharge-pipe g', thus allowing water to flow from said vessel G into the tank W. The rapidity of flow from vessel G can be regulated by means of the cock g^2. At the moment the vessel G starts to descend the pipe g' will be opened, and simultaneously therewith the toe or arm g^5 will leave the end of the plunger b', thereby allowing the pressure of air to close valve b^3 against its seat. The air-pressure from the reservoir A will now be cut off from the submerged drum D in the well E and the vent b opened. This operation will instantly relieve the drum D and allow water to flow into it through its valve-opening. As the arm of beam J, on which is hung the bucket G, descends, the ball l will roll toward the fulcrum of this beam and insure a steadiness to the working thereof. When the water has run out of the bucket G, the left-hand arm of beam J will preponderate and the bucket will rise, the several parts again assuming the positions shown in Fig. 1. The valve b^3 will now be open, the vent b closed by plunger b', the outlet-pipe of bucket G closed by the stationary valve g, and the valve i in the submerged drum closed. Communication is established between the storage-vessel A and drum D and the water in it elevated by the compressed air and discharged into the bucket G, which, when it is filled, will again descend.

It will thus be observed that the operation of my water-elevator is strictly automatic as long as the storage-vessel A is kept charged with air. If it is desired to control the movements of the apparatus by hand, this can be done by the employment of a hand-lever, L, as indicated in Fig. 2 in dotted lines, by means of which the plunger b' and its valve can be operated.

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

1. The combination, with the storage-vessel, the submerged drum provided with a valve opening upward, a valve-box provided with a connected plunger and valve, and an air-vent, of pipes connecting the vessel A, the drum D, and valve-box B, a vibrating beam, J, provided with a toe, t, adapted to act on plunger b', a bucket hung from one arm of said beam and provided with an outlet-pipe, a stationary valve for this outlet-pipe, and a pipe leading from the drum D and arranged to discharge water into said bucket, all substantially as described.

2. The combination, with a pivoted working-beam, J, and a bucket, G, pivoted to this beam and provided with an outlet and a valve-seat in its bottom, of a stationary adjustable valve adapted to close upon the valve-seat in the bottom of the said bucket, a support for the valve, a support for the beam J, a supply-pipe, F, emptying into said bucket G, and means for elevating the water, substantially as described.

3. The combination, with a pivoted weighted beam, J, provided with a toe, g^5, a bucket, G, pivoted to the said beam, and a rolling counterbalancing-weight upon said beam, of a stationary valve, g, adapted to close upon a valve-seat in the bucket G, a valve-box, B, a reciprocating valve in said box, this valve being opened by the toe g^5 on the beam J, air-pipes d e, a submerged drum, D, provided with an inwardly-opening valve, and a water-supply pipe, F, leading from the drum D to the said pivoted bucket G, all arranged as and for the purpose herein stated.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN K. LEEDY.

Witnesses:
CHAS. D. DAVIS,
CHAS. D. JOST.