(No Model.)

A. VAN NESS.

WATER ELEVATOR.

No. 307,243. Patented Oct. 28, 1884.

Fig: 1.

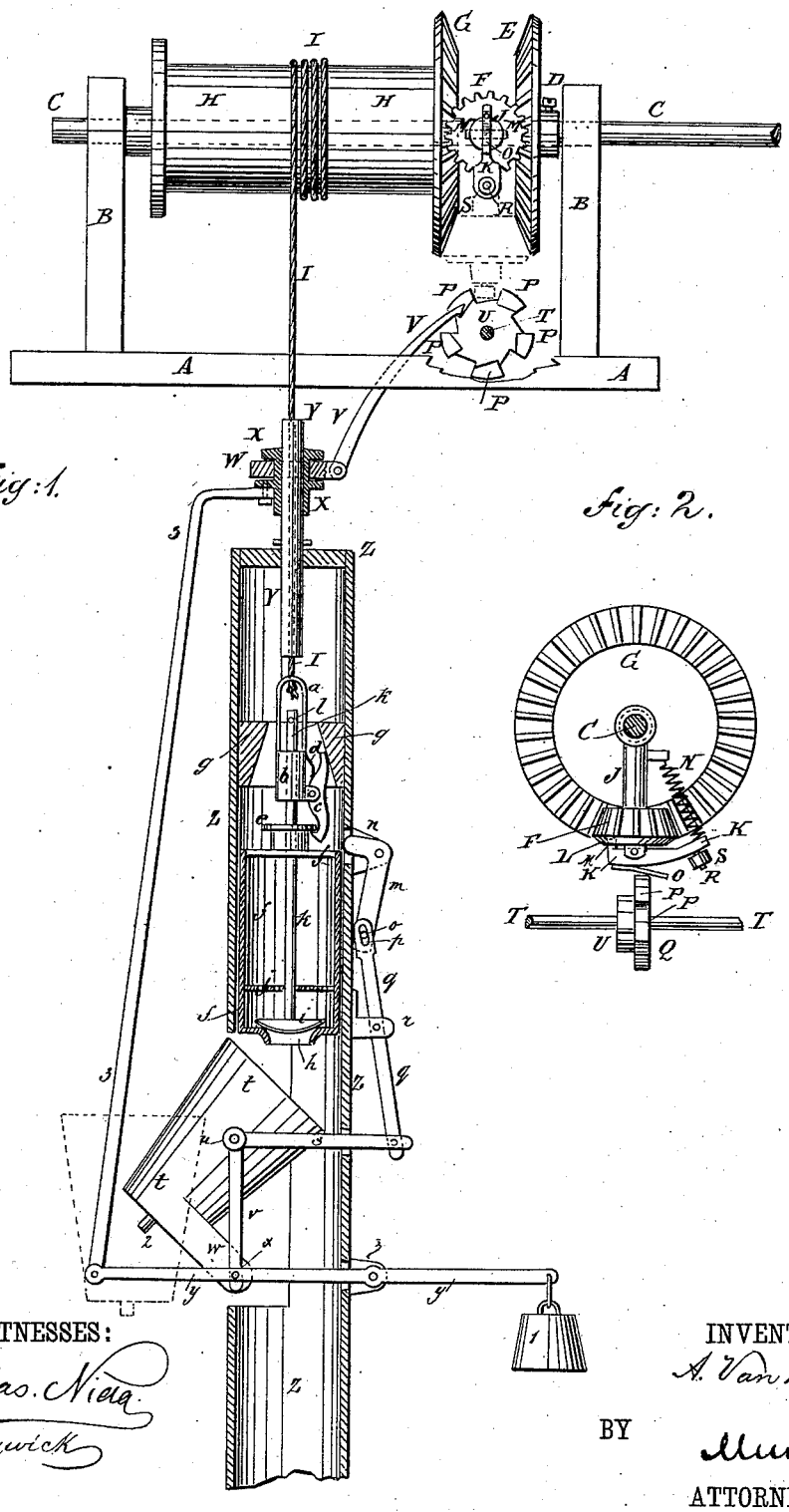

Fig: 2.

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WATER-ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 307,243, dated October 28, 1884.

Application filed December 20, 1883. (No model.)

To all whom it may concern:

Be it known that I, ALBERT VAN NESS, of Lowell, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Water-Elevators, of which the following is a full, clear, and exact description.

Reference is to be had to the accompanying drawings, forming part of this specification, in which similar letters of reference indicate corresponding parts in both the figures.

Figure 1 is a side elevation, partly in section, of my improvement. Fig. 2 is an elevation of a part of the gearing, the shaft being shown in section.

The special object of this invention is to facilitate the raising of water from deep wells by wind or other power.

The invention consists in a water-elevator constructed with the driving-shaft and the drum carrying the hoisting-rope connected by three gear-wheels, the intermediate gear-wheel being pivoted to a swinging hanger, and connected therewith by a spring-held lever-latch provided with a trip-spring and a stop-roller and a reversing-wheel and its operating mechanism, whereby the motion of the said drum will be automatically reversed. With the well-tube, the hoisting-rope, and the bucket having valve and valve-stem, stop-plate, and flanged ring are connected a U-bar carrying a short tube provided with a spring-pressed lever-catch and a block having conical interior, whereby the said valve will be opened automatically to discharge the water. With the well-tube and the bucket are connected a swinging spout having a discharge-tube, and a rigid arm and connecting-bars and levers, whereby the said spout will be swung inward to receive the water by the upward movement of the said bucket. The swinging spout and the reversing-wheel are connected by a weighted lever, a connecting-bar, two collars sliding on a guide, and a pawl and ratchet-wheel, whereby the said reversing-wheel will be automatically operated by the movements of the said spout, as will be hereinafter fully described.

A represents a frame placed at a higher level than the reservoir into which the water is to be discharged.

To the frame A are attached standards B, in bearings in the upper parts of which revolves the shaft C, to which motion may be given by a windmill or other convenient power.

To the shaft C is secured, by a set-screw, D, or other suitable means, a beveled gear-wheel, E, into the teeth of which mesh the teeth of the small beveled gear-wheel F. The teeth of the beveled gear-wheel F also mesh into the teeth of the beveled gear-wheel G, attached to the end of the drum H, which revolves loosely upon the shaft C, and to which is attached and upon it is wound the hoisting-rope I. The small beveled gear-wheel F revolves upon the outer end of the arm J, the inner end of which has a hole formed through it to receive and turn loosely upon the shaft C.

To the outer end of the arm or hanger J is pivoted a lever-latch, K, having an inwardly-projecting point, L, at one end, to enter one or another of the recesses M, formed in the outer side of the small beveled gear-wheel F, and hold the said wheel F from revolving upon the said arm or hanger J, thus locking the three gears E F G together. The lever-latch K is held in gear with the gear-wheel F by a spiral spring, N, one end of which is attached to the rear end of the said lever-latch K, and its other end is attached to the hanger J, or to a support attached to the said hanger.

To the outer side of the forward end of the lever-latch K is attached the forward end of a spring, O, the rear end of which projects in the rear of the pivot of the said lever-latch K, and which is made of such a strength as to raise the forward end of the lever-latch K out of gear with the small beveled gear-wheel F, when the rear part of the said spring comes in contact with a projection, P, of the wheel Q.

To the outer side of the rear end of the lever-latch K is attached a pin, R, to which is pivoted a small roller, S, to strike against the side of the projection P, that throws the lever-latch K out of gear, and hold said latch out of gear, and also prevent the hanger J from being carried forward when the gear-wheel F is free from the said lever-latch K, while allowing the wheel Q to be turned freely. The wheel Q revolves upon a shaft, T, attached to the frame A, or other suitable supports, and with the said wheel Q is rigidly connected a

ratchet-wheel, U, having twice as many teeth as the wheel Q has projections P.

With the teeth of the ratchet-wheel U engages the hook-pawl V, which is attached to a collar, W, placed loose in an annular groove formed in a second collar, X. The collar X is placed and slides upon a guide-tube, Y, which passes through the closed upper end of the well-tube Z, and through which the hoisting-rope I passes. The end of the hoisting-rope I is attached to the bend of the short U-shaped rod *a*, the ends of which are attached to the upper end of the short tube *b*.

To the side of the lower end of the short tube *b* is pivoted the lever-catch *c*, the upper end of which is held outward by a spring, *d*, attached to the said tube *b*, so that the lower end of the said lever-catch *c* will engage automatically with the flanged ring *e*, formed upon or attached to the closed top of the bucket *f*. The lever-catch *c* is withdrawn from the flanged ring *e* by its upper end striking against the conical inner surface of the block *g*, secured in the upper part of the well-tube Z.

In the bottom of the bucket *f* is formed an opening, *h*, which is closed by an upwardly-opening rubber-faced valve, *i*. The upward movement of the valve *i* is limited by a perforated plate, *j*, an annular flange, cross-bars, or other suitable stop attached to the lower part of the bucket *f*.

k is the valve-stem, which passes up through the center of the bucket *f*, through the flanged ring *e*, through the tube *b*, and has a cross-pin, *l*, or other stop attached to its upper end to rest upon the upper end of the tube *b*, and which should have sufficient strength to support the weight of the bucket *f*, even when filled with water.

m is an elbow-lever, which is pivoted at its angle to lugs *n*, attached to the side of the well-tube Z, in such a position that the end of the short upper arm of the said lever will project inward through a slot in the side of the said well-tube, so as to be struck and operated by the upper end of the bucket *f* in its upward movement.

To the lower end of the long lower arm of the elbow-lever *m* is attached a pin, *o*, which passes through a short slot, *p*, in the upper end of the lever *q*, so that the two levers will work freely upon each other. The lever *q*, a little distance above its center, is pivoted to lugs *r*, attached to the side of the well-tube Z, and to its lower end is pivoted the outer end of a connecting-bar, *s*, the inner end of which is pivoted to the side of the spout *t* by a pivot, *u*.

To the pivot *u* is rigidly attached the upper end of a bar, *v*, the lower end of which is rigidly attached by a pivot, *x*, to the outer end of an arm, *w*, formed upon or attached to the side of the lower end of the spout *t*.

To the pivot *x* is pivoted a lever, *y*, which is pivoted to the lugs *z*, formed upon or attached to the side of the well-tube Z.

From the rear end of the lever *y* is suspended a weight, 1, of such a gravity as to raise the spout *t* when empty and in the position shown in dotted lines in Fig. 1, raising the bar 3 and the collars X W, and pushing the pawl V forward to engage with the next tooth of the ratchet-wheel U, ready for the next stroke.

The spout *t* is made of sufficient capacity to contain the contents of the bucket *f*, and has its upper end open and its lower end closed, and provided with a small discharge-tube, 2, through which the said spout will gradually empty itself.

To the forward end of the lever *y* is pivoted the lower end of the bar 3, the upper end of which is bent inward, and is attached to the collar X. With this construction, when the various parts of the elevator are in the positions shown in Fig. 1, and the shaft C and gear-wheel E continue to revolve forward, the gear-wheel E carries the small gear-wheel F and the gear-wheel G and drum H with it in its revolution, winding the rope I upon the drum H and raising the bucket *f*.

In the drawings the bucket *f* is represented as having pushed the short arm of the lever *m* upward and outward to swing the upper end of the spout *t* into the well-tube to receive the water. As the bucket *f* continues to rise, the conical inner surface of the block *g* pushes the upper end of the lever-catch *c* inward, withdrawing the lower end of the said catch from the flange of the ring *e*, and allowing the bucket *f* to drop until the stop-pin *l* of the valve-rod *k* comes in contact with the upper end of the short tube *b* and is stopped, opening the valve *i*, and the plate or flange *j* comes in contact with the valve *i*, stopping the bucket *f*. As the valve *i* leaves its seat the water flows out into the spout *t*, and by its weight brings the said spout into the position shown in dotted lines in Fig. 1. This movement of the spout *t* operates the bars *v s* and the levers *q m* to project the upper arm of the said lever *m* into the interior of the well-tube Z, ready to be struck and operated by the bucket *f* at its next ascent. This movement of the spout *t* also operates the lever *y* and bar 3 against weight 1, to draw the collars X W and the pawl V downward, turning the ratchet-wheel U one tooth, and bringing a projection, P, across the path of the lever-latch K, to trip the said lever-latch and release the gear-wheel F, allowing it to be revolved independently by the revolution of the gear-wheel E, the hanger J being held from being carried forward by the roller S coming in contact with the said projection P. This revolution of the gear-wheel F revolves the gear-wheel G and drum H in the other direction to that in which they revolved when locked together with gear E, thereby unwinding the rope I and lowering the bucket *f*. When sufficient water has been discharged from the spout *t* through the tube 2, the weight 1 overbalances the said bucket and the bar 3

and collars X W, and raises the said bucket, bar, and collars, pushing the pawl V forward for another stroke, as hereinbefore described. As the bucket *f* strikes the water it is checked for an instant, and the weight of the tube *b* causes the lever-catch *c* to engage with the flange of the ring *e*. As the motion of the drum H is continued, the bucket *f* becomes filled with water, and the rope I becomes wholly unwound and begins to wind up in the other direction, again raising the bucket *f*, which again trips the lever *m*, swings the spout *t* inward, and discharges the water again into the said spout. The weight of the water causes the spout *t* to swing outward and operate the pawl V, to again turn the ratchet-wheel U one tooth and withdraw the projection P from the path of the lever-latch K, allowing the hanger J and gear-wheel F to be again carried forward by the gear-wheel E, carrying the gear-wheel G and drum H with them, again reversing the motion of the drum H, unwinding rope I, and lowering the bucket *f*, the motion being thus reversed automatically and the bucket lowered and raised successively.

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

1. In a water-elevator, the combination, with the driving-shaft C and the drum H, carrying the hoisting-rope I, of the gear-wheels E F G, the hanger J, the spring-held lever-latch K, provided with the trip-spring O, the wheel Q, having projections P, and its operating mechanism, substantially as herein shown and described, whereby the motion of the said drum will be automatically reversed, as set forth.

2. In a water-elevator, the combination, with the well-tube Z, the hoisting-rope I, and the bucket *f*, having valve and valve-stem *i k*, stop-plate *j*, and flanged ring *e*, of the U-bar *a*, the short tube *b*, the spring-pressed lever-catch *c*, and the block *g*, having conical interior, substantially as herein shown and described, whereby the said valve will be opened automatically to discharge the water, as set forth.

3. In a water-elevator, the combination, with the well-tube Z and the bucket *f*, of the swinging spout *t*, having discharge-tube 2 and rigid arm *w*, the connecting-bars *v s*, and the levers *q m*, substantially as herein shown and described, whereby the said spout will be swung inward to receive the water by the upward movement of the said bucket, as set forth.

4. In a water-elevator, the combination, with the swinging spout *t*, the reversing-wheel Q P, and the guide Y, of the weighted lever *y*, the connecting-bar 3, the collars X W, the pawl V, and the ratchet-wheel U, substantially as herein shown and described, whereby the said reversing-wheel will be automatically operated by the movements of the said spout, as set forth.

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Witnesses:
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