H. H. May,

Water Elevator.

No. 50,944. Patented Nov. 14, 1865.

Fig: 1.

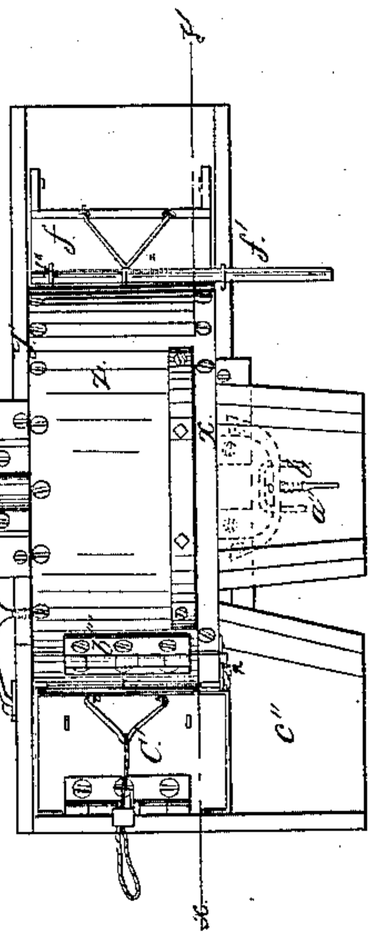


Fig: 2.

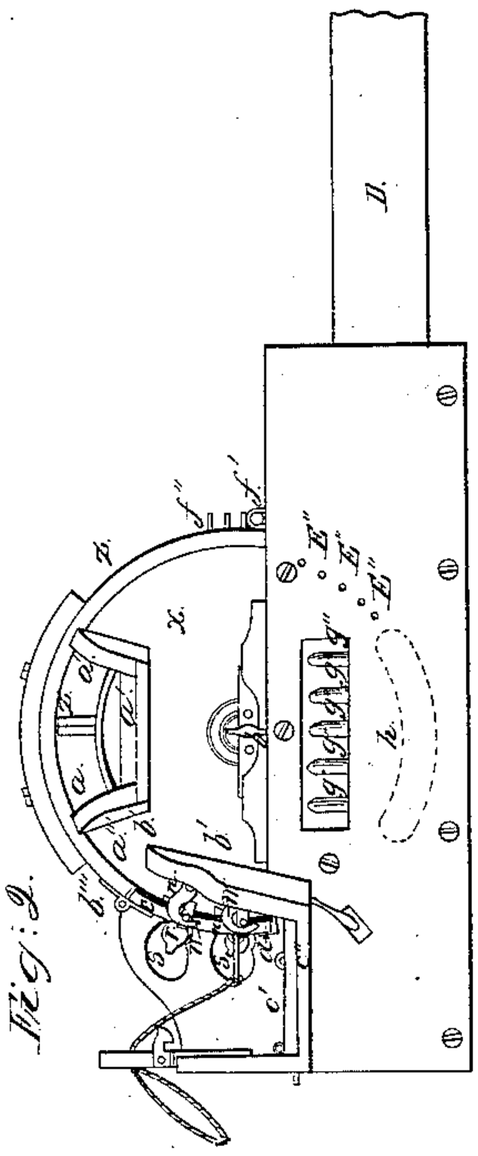


Fig: 3.

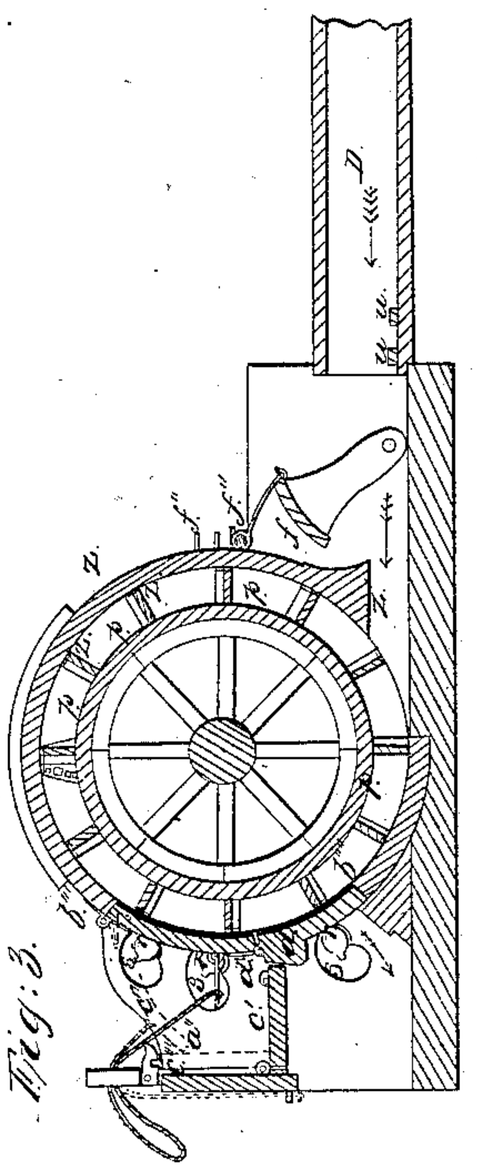


Fig: 4.

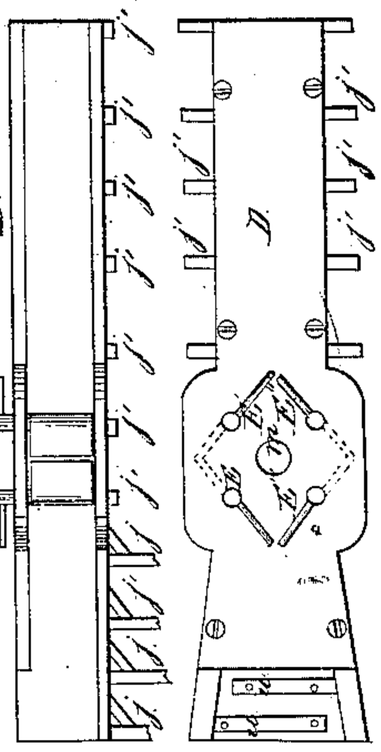


Fig: 5.

Fig: 6.

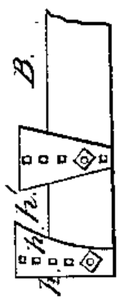


Fig: 7.

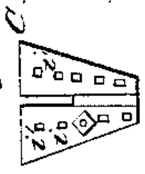


Fig: 8.

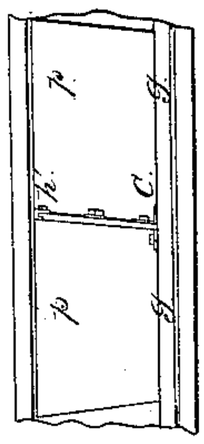
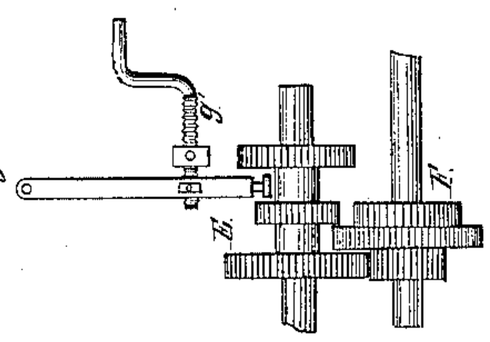


Fig: 9.



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UNITED STATES PATENT OFFICE.

H. H. MAY, OF GALESBURG, ILLINOIS.

IMPROVEMENT IN WATER-ELEVATORS.

Specification forming part of Letters Patent No. **50,944**, dated November 14, 1865.

To all whom it may concern:

Be it known that I, H. H. MAY, of the city of Galesburg, in the county of Knox and State of Illinois, have invented a new and Improved Mode of Elevating Water to Various Altitudes; and I do hereby declare that the following is a full and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, in which—

Figure 1 is a plan or top view of my improved water-elevator; Fig. 2, a side elevation; Fig. 3, vertical section of same, as indicated by line *x y* in Fig. 1; Fig. 4, side view of flume or tunnel detached from machine; Fig. 5, top view of same; Figs. 6 and 7, views in detail, showing manner of securing paddle or buckets to water-wheel by slotted plates and screw-bolts; Fig. 8, a view of a portion of wheel and casings, showing spiral position of buckets or paddles and shape of wheel; Fig. 9, cog-gearing, to be applied as the circumstances of the case require in elevating water to various heights.

Like letters in all figures of the drawings indicate like parts.

The object of my invention is to elevate water in large quantities, for culinary or other purposes, fifty feet (more or less) above the surface of the lake (or other place) from which it is taken; to bring the water so to be raised a long distance from the shore, if necessary, in order to get deep, pure, cool water; by a slight change in the machine to deliver the water to another place—say twenty-five feet high—in larger quantities, to cleanse streets, sewers, &c., and by another change to elevate nine thousand eight hundred and forty tons of water per hour six and one-half feet high with a common four hundred horse-power steam-engine.

To render my invention more intelligible, and so that others can make the machine and use it, I will now describe its construction and operation as adapted to these four objects in their order, as above.

To accomplish this I dig a ditch some five feet below the surface of the lake and sixteen feet or more wide to some suitable place to set my steam-engine, which I set there ready to turn my water-wheel before that is finished. The water-wheel is to be similar to those used on a side-wheel steamboat. It is to be eighty feet in diameter, to have paddle-wheels four feet apart, each paddle to be about four and one-half feet wide and sixteen feet long, which will extend across the wheel. *z* shows the face or periphery of the wheel, *x* shows one side or front, and *y* shows the other side or rear of the wheel. As the wheel revolves the spaces between the paddles are filled with water at the bottom, and thence carried to the top of the wheel and there to flow out. I now hang the frame of the wheel so that when it revolves each paddle (if in its place) would sweep the bottom of the ditch; but before putting on the paddles I make a water-tight casing, z'', all around the circle which the paddles are to describe, except the space z''', to admit of water five feet deep from the ditch. I then turn the inside of this casing smooth with a lathe attached to the arms of the wheel by putting the wheel in motion by the steam-engine. The edge of each paddle is to pass very close to this turned surface. I now make a casing, a'', five and a half feet wide all around the front side of the wheel, except a space of some eighteen feet from *a* to a'''. The inside of this casing is also turned to fit the front ends of the paddles, so as to confine the water on them till it comes to *a*. Between the rear ends of each paddle is a tight partition, *g*. (Seen in Fig. 8.) The outer edges of these partitions are made fit the turned circles of the casings *z* to prevent leakage at that end. I also make a tight floor, *p*, (seen in Figs. 3 and 8,) between the inner edges of all the paddles, in such manner that the floor shall be one foot nearer the axis of the wheel (the front ends of the buckets) than at their rear ends. Thus the whole floor constitues a conic cylinder around the axis of the wheel, which causes a more ready flow of water as the paddles pass from *a* to a''.

It will also be observed that the paddles are all placed in a spiral position on the wheel, which causes a still more rapid flow of water by its centrifugal force. Thus the water flows out rapidly from *a* to a''' on to spout a'', and thence away ready for use. Under certain circumstances I would open another space like from *a* to a', on the opposite side of the wheel, to discharge the water there also, and make the floor of the cylinder the highest between the two places of discharge.

As fast as the edges of the paddles or of the

partitions between them wear off so as to leak water they are moved out to touch the circular casing Z, the bolts which hold them being first loosened. For this object the paddles and the partitions extend down, through, and below the floor of the cylinder some three inches.

B represents the cast stays to hold the front ends of the paddles. They have a flange, *h*, at one edge to clasp the ends of the paddles, and slot-holes *h h* for bolts to confine them in position. The rear end stays have slot-holes *i i'* for bolts to confine the paddles, and slot-holes made to diverge, so that the bolts passing through them and the ends of the partitions will not bind when the partitions are moved out. Other stays similar to B are made to sustain the middle of the paddles.

I place one set-screw, *b*, to press against the front end of the wheel-shaft, and another like screw to press the other end. By these I am able to adjust the wheel so as to prevent all attrition by its lateral movements; and for the same object, as also to prevent the weight of water from springing the casings from the front ends of the paddles and causing a leak there, I place screws *b''* opposite *b' b'* in the other side of the frame. These screws press the wheel by friction rollers or slides with any force desired. I build a covered flume or tunnel, D, on floats, scows, &c., placed along the lake-shore the whole length of the distance which I desire to take water from. I plank this tunnel tight, only leaving it open at each end. The end to be sunk in deep water is enlarged and grated. It is also made to stand on posts *j j* some five feet above the bottom of the lake. The sills *j'' j''* of the tunnel are left to project at both sides. On these I put planks to retain stone to sink the tunnel to the bottom and hold it there. When the tunnel is all ready I swing the end which is prepared for deep water out into the lake, and unite the other end to the flume or tunnel in the ditch, and then let the sills down onto the bottom of the lake, beginning at the shore, so that the water to supply the wheel must come through this tight tunnel, and thence from the deep, pure, cool lake-water.

To elevate water in larger quantities and some twenty-five feet high, I swing section *c* of the casing on hinges *b'''* out to the position of dotted lines *c''*, so that as the wheel turns the water will flow out onto apron *c'* and over spout *c''*, ready for use. To elevate water in still larger quantities, I dig a ditch from my wheel, opposite the side where the water enters, sufficient to carry off nine thousand eight hundred and forty tons of water per hour, and plank the descent into this ditch, beginning some eleven feet above the base of the wheel at *b''''*, so as to convey the water into the ditch smoothly.

During the former operations the section *c* of the casing has been confined to the wheel by the apron *c'* acting as a brace against it; but now *d* must be removed to let the water pass over the summit *b''''*. For this purpose I fasten *c* to *d* by hooks *d' d'*, and turn up apron *c* to the place of dotted lines *c''''*, and into the space so made I swing out *c* and *d* (now fastened together) to the position of the dotted lines, thus yielding a space of some thirty-five feet for the water to pass off freely from the paddles. In order to secure a plentiful supply of water in this operation I turn back the lock-gates E''' E''' D, and so let in water near the shore. If the water when it is high comes in so fast as to rush in behind the paddles as they pass point Z, and with a backlash force meet the next descending paddle, this difficulty will be indicated by the spouting of water from the holes E'' E'' E'' as the water rises, and the remedy is to let down the breakwater-gate *f* by the lever *f''*. This gate is made with arms extending back and hung at the sides of the flume to swing on pins *f*. These pins resist the force of the water and sustain the friction, which, together with the slanting position of the gate, causes it to raise easily in the water. From this gate to Z it is planked, so as to conduct the water smoothly under the paddles. When this gate does not sufficiently adjust the quantity of water to the power of the engine in elevating water to various heights I connect the engine to the water-wheel by two sets of spur cog-wheels, E and F, each having three tiers of cogs to match its neighbor cogs, as shown, and the set E is made to slide longitudinally on its shaft by the screw *g* to bring the cogs by tiers in contact. Thus I secure the required slow, quick, and medium revolutions of the water-wheel. When the paddles first dip the water a quantity of air will be caught between the paddles. This air will rush out through the holes *g'' g'' g''*, to assist which the holes terminate in a large cavity on the inside of the front casing next the ends of the buckets. (Indicated by the dotted lines *h*.)

To prevent the front casing, Z, and the rear frame from being spread apart by the weight of the water, they are held in their place by clasps W W W, which are firmly attached to sections *c* and *d*.

To confine sections *c* and *d* firmly to the wheel, when the water is to be raised high, in addition to *c'*, as a brace, the cam-hooks *h* are used, and also the cams *r*, which are turned by a lever outside, and are so set that to turn them back retires them into recesses *s*, out of the way of *c* and *d* as they swing out, as described.

To prevent drift-sand from passing through the flume into the wheel, I pin twelve-foot scantling *u u u* across the floor of a sixteen-foot wide flume. They should be some two feet apart, and interlock the ends, alternately touching the sides of the flume. I place standing grates across the flume, (near the wheel, and leaning toward it,) and so thick that no object can pass between them to the wheel larger than a small fish.

To remove the drift-sand or any other thing from between the lock-gates and the wheel, I

turn the lock-gates E''' E''' around to post *m*, which stops the flow of water, when the inclosed water is drawn off by the wheel.

By the plan herein contemplated heavy bodies of water are rolled up an inclined plane, as heavy solid bodies are rolled up the same on friction-rollers. Ordinary pumps lift the water direct, which requires, perhaps, six times the power to lift a ton seven feet high that it requires by this method to roll a ton over an eminence seven feet.

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

1. A conic water-tight wheel, *p*, casing *g*, and outer casing, Z, as constructed and arranged, substantially in the manner and for the purpose herein described.

2. In combination therewith, the spiral position of paddles or buckets as secured to the wheel by means of stags or plates B and C, substantially in the manner and for the purpose herein set forth.

3. The gate *f*, lever *f'*, and pins *f''*, and the holes E'' E'', for adjusting the quantity of water in its passage to the wheel, substantially as described.

4. The air-passages *g''* *g''*, as arranged in relation to the conic wheel, substantially in the manner and for the purpose described.

5. Flume or tunnel D, with its enlarged area for the gates, and the gates E'' E'', as constructed and arranged, substantially in the manner and for the purpose set forth.

6. Cog-gearing E, F, and *g'*, in combination with the gate *f* and hole E, for a better adjustment of the quantity of water in its passage to the wheel, substantially in the manner as set forth.

7. Spouts *a''* *c''* and opening from *a'* to *a''*, as constructed substantially in the manner and for the purpose set forth.

8. The hinged gate *c*, hinged apron *c'*, and movable portion of casing, as constructed, arranged, and operating in the manner and for the purpose herein set forth.

H. H. MAY.

Witnesses:
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J. GRANT.