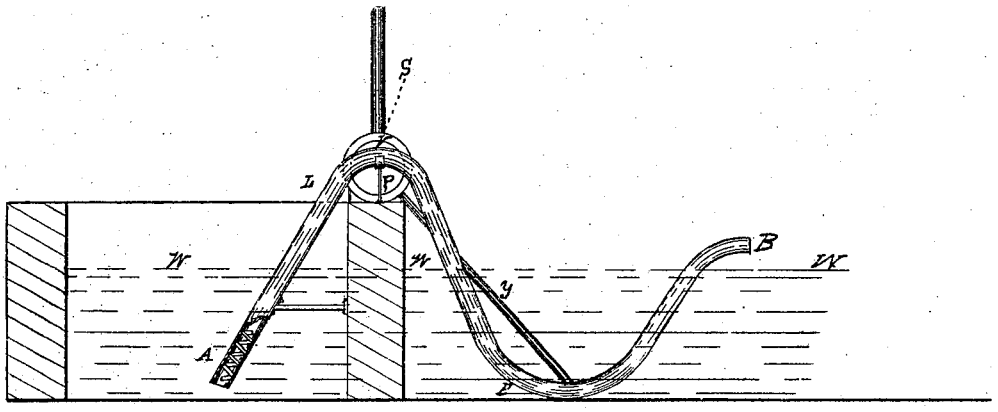
EMILY E. TASSEY.

SIPHON PROPELLER-PUMP.

No. 184,996. Patented Dec. 5, 1876.



Witnesses.

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EMILY E. TASSEY, OF PITTSBURG, PENNSYLVANIA.

IMPROVEMENT IN SIPHON PROPELLER-PUMPS.

Specification forming part of Letters Patent No. **184,996**, dated December 5, 1876; application filed May 27, 1876.

To all whom it may concern:

Be it known that I, EMILY EVANS TASSEY, of the city of Pittsburg, county of Allegheny, State of Pennsylvania, have invented a new Siphon Propeller-Pump; and I do hereby declare the following drawings and engravings are sufficient to enable any person skilled in the art or science to which it most nearly appertains to make and use my said invention without further invention or experiment.

The nature of my invention is to provide means of discharging large portions of water—as from a coffer-dam—into the river; and consists of a bent tube, in the end of which, in the bottom of the coffer-dam, is a screw-propeller or other mechanical device for raising water, and utilizes the atmospheric pressure in sustaining the water in that portion of the tube air-tight above the water-line, thus holding the water *in equilibrio* in the two equal arms of the bent tube. In order to accomplish this purpose, I employ a bent tube containing a screw-propeller, moved by steam or other power, and a jet of compressed air, introduced near the base of the discharging-arm.

Referring to the drawings to more fully illustrate and describe my invention, Figure 1 is a side elevation.

Similar letters indicate in each of the figures like parts.

S represents the steam-engine or other power employed to rotate the screw-propeller by means of the crank P. A is the screw-propeller. W is the water-line. B is the mouth of the tube, a few inches above the water-line. V is that portion of the tube above the water-line, in which, after the air is displaced, the water is sustained by atmospheric pressure. T is a small tube, reaching from the engine to the base of the discharging-arm of the siphon, introducing a jet of compressed air, which forces the water upward in the discharging-arm, both by mechanical pressure and by its natural expansion and ascension; also, according to the law of transmitted pressure, as shown in hydraulic machines, the force of the pressure of the air is multiplied by the number of times the area of the small air-tube is contained in the area of the water-tube. Let the area of the air-tube be one inch, and its force five pounds, and the area of the water-tube ten inches; the five pounds of air is multiplied by ten, equalling fifty pounds of pressure. Again, let the height of the water from E to B be ten feet, its weight is five pounds per inch, or fifty pounds for the ten inches, equalling the five pounds of air-pressure multiplied by ten inches in area.

Power being applied to the screw, its motion raises the water, displacing the air in that portion of the tube, air-tight, above the water-line. Then is the water from A to E *in equilibrio*. Above the water-line it is sustained by atmospheric pressure to any height less than thirty feet.

The progress of the water in the tube is that of a wave, and it is produced by the same causes that produce the wave, viz., unequal pressure on a body of water. There are, first, the pressure of the screw; second, the jet of air; third, the suction at V; fourth, the gravitation of the water from V to E.

The velocity of the flow in a siphon is in proportion to the height of the source above that of the discharge, and conversely. The greater velocity represents the higher source. At the start, when the coffer-dam is full, the curved tube above the water-line being full, it is easy to give the water a velocity equal to the production of a new virtual water-level at the point L, ten feet above the water-line. If the velocity is sixteen and one-twelfth feet per second vertically, the water from V to E will fall freely by gravitation, and, falling, it leaves a vacuum, to which the water coming from A must rush. There is here an equilibrium of motion and of force. As the water descends in the coffer-dam, the velocity diminishes, or, in other words, the virtual water-level descends, but at a slower rate, because there is the preponderance of the water *in equilibrio* in motion with its acquired velocity. Let the water be ten feet deep in the coffer-dam when full, the power of the screw and air-jet, with the accumulated force of the water in motion, will, when it is nearly empty, raise that low water ten feet, or to the descending virtual level. With the last foot of water carried up the tube, the air rushes up to fill the vacuum at V, and the water falls from V to the water-level outside; also, when a strong current of water is convenient, the end of the discharge

pipe or tube may be placed in that current, thus aiding the discharge by the suction of the current; also, the discharge-tube may terminate at E, a point of nearly the same level as the bed of the coffer-dam, and on the end of the tube, at or near E, there shall be placed a valve, opening outward, to prevent the return of the water to the coffer-dam.

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

In combination with the curved tube, arranged as described, the propeller-pump in the receiving end, and the air-supply pipe in the discharging end of the tube, as and for the purpose described.

In witness whereof I have hereunto set my hand.

EMILY E. TASSEY.

Witnesses:

A. C. JOHNSTON,

JAMES BLACK.