C. L. MERRILL.

Chain-Pump.

No. 164,098. Patented June 8, 1875.

Fig. 1

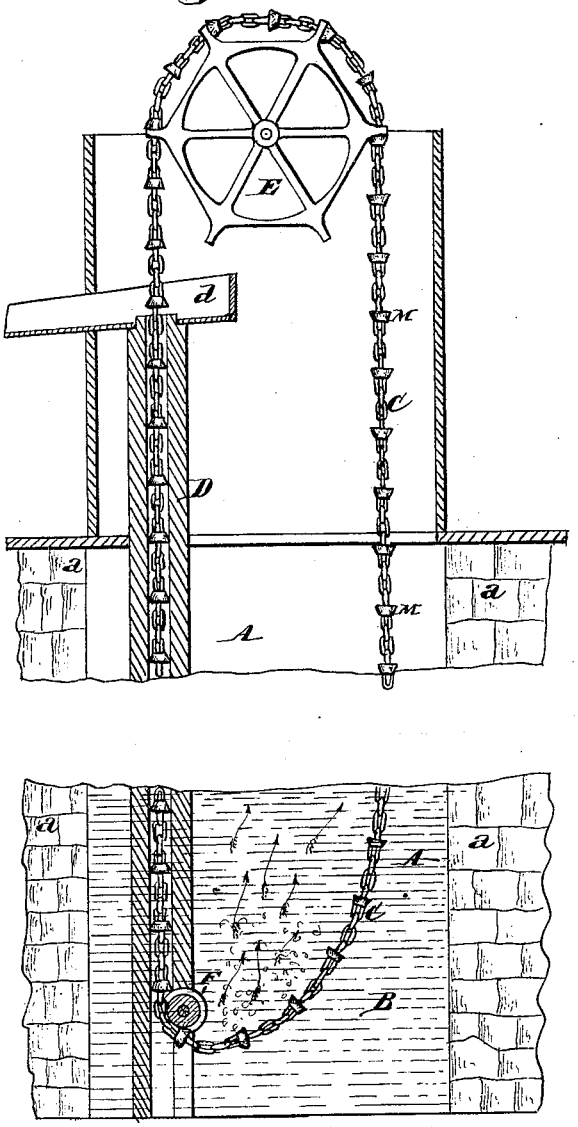


Fig. 2

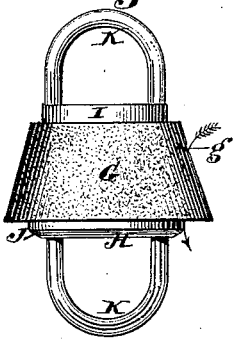
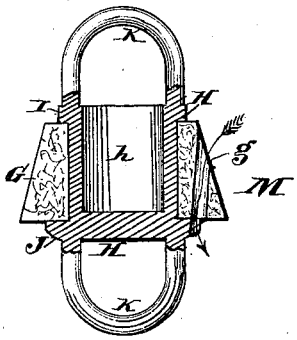


Fig. 3



Attest

D. D. Kennedy.

O. N. Dressel

Inventor

Charles L. Merrill

per Wm. Hubbell Fisher,

his atty in fact

UNITED STATES PATENT OFFICE.

CHARLES L. MERRILL, OF EVANSVILLE, INDIANA, ASSIGNOR OF ONE-HALF HIS RIGHT TO LORENZO D. BARTLETT, OF HUDSON, NEW YORK.

IMPROVEMENT IN CHAIN-PUMPS.

Specification forming part of Letters Patent No. **164,098**, dated June 8, 1875; application filed April 22, 1875.

To all whom it may concern:

Be it known that I, CHARLES L. MERRILL, a resident of the city of Evansville, in the State of Indiana, have invented certain new and useful Improvements in Chain-Pumps, of which the following is a specification:

My invention relates to that class of devices for raising water which consist of an endless chain or cord, to which, at regular intervals, are attached disks or buttons, or the like, which fit the interior of a tube at one end, placed in the liquid to be drawn, and at the other to the delivery-spout, the chain or cord being suspended and preferably operated by a roller or sheave above the tube, the liquid being elevated by the chain being drawn upward through the tube.

My invention consists in a novel construction of the button, or bucket, as in this case it is more properly called, the first novel element of the same being the formation of the bucket so that it shall have in its center a considerable cavity for the retention of air when the bucket is descending, and for the conveyance of such air under the water, and the discharge of same at the point where the chain is the farthest below the surface of the liquid, the advantage of this discharge being that the liquid is purified by this air, because, first, the latter agitates the liquid; and, secondly, carries with it many of the impurities otherwise retained in the liquid.

In the accompanying drawing, making a part of this specification, Figure 1 represents a well containing a chain-pump embodying my improvements. Fig. 2 is a side elevation of my improved chain-bucket, and Fig. 3 represents a vertical section through the center of the same.

A designates the well, the sides of which are indicated by *a*, and the water in it by B. An endless chain, C, provided with my improved buckets M, is hung upon a wheel, E, by means of which it is rotated. The chain passes down into the water of the well, preferably deep enough so as to be near the bottom of the latter, and returns upward through a tube, D, whose diameter is such that the flexible periphery of each bucket fits tightly therein. A delivery-spout, *d*, at the top of the tube conveys away the water raised through the tube. An idle pulley, F, is placed at the point where the chain enters the tube, to prevent the former from engaging with or being obstructed by the edge of the tubes.

My improved bucket is constructed as follows: It consists of a hollow cylinder, H, open at the upper end and closed at the lower, thus forming a little bucket or pail, *h*. To each end of this cylinder is attached or cast a link, K, lying in the same vertical longitudinal plane as passes through the center of the cylinder. Each end of each link is attached to one edge of the cylinder. Flanges I and J, the one at the upper, the other at the lower, portion of the cylinder, project from its periphery, and form between them a recess for the reception and retention of a packing, G. This packing is preferably made of rubber, but may be made of any other material suitable for packing. The exterior shape of the packing when in position on the cylinder is that of a truncated cone. The advantages of this form is that in packing so shaped the lower exterior portion perfectly and readily fills the bore of the tube D, not permitting the water to escape downward, and at the same time creates little friction with the sides of the tube. The packing and flange J are perforated so as to afford a limited communication between the spaces in the tube D above and below the bucket.

In operation, the chain is moved by means of wheel E, and the buckets M G are carried down in an inverted position, and convey within the bucket-cavity *h* air to the capacity of the said cavity. As the buckets in turn reach the bottom of the course of the chain, and are being turned over, prior to their entering the tube, as their mouths are elevated and bottoms depressed, the air contained in them will be discharged into the water, and will rise through the latter, agitating it and at the same time carrying from it much of the foul impure gases and the like, frequently found in wells, and usually caused by stagnation, more especially in rain-water wells or cisterns, or by the mineral deposits through which water of spring-wells often passes. The result of this agitation and discharge of air

through the water is an improved condition of the latter. The buckets next pass under the idle roller F and into the tube, carrying up with them as much water as the capacity of the tube and the space between the buckets will admit of, and delivering the same at the trough *d*. When the chain is at rest, the orifice *g* through each bucket will permit the water in the tube to gradually return to the well, thereby preventing the water from being heated in summer or frozen in the tube in winter.

What I claim as new, and desire to secure by Letters Patent, is—

The chain-pump bucket M, consisting of the cylinder H, air-space *h*, links K, flanges I J, and packing G, provided with orifice *g*, substantially as and for the purposes set forth.

C. L. MERRILL.

In presence of—
E. P. HUSTON,
H. T. WILSON.