

No. 645,171.

Patented Mar. 13, 1900.

C. HEFFNER.  
BUCKET CHAIN PUMP.  
(Application filed Dec. 15, 1899.)

(No Model.)

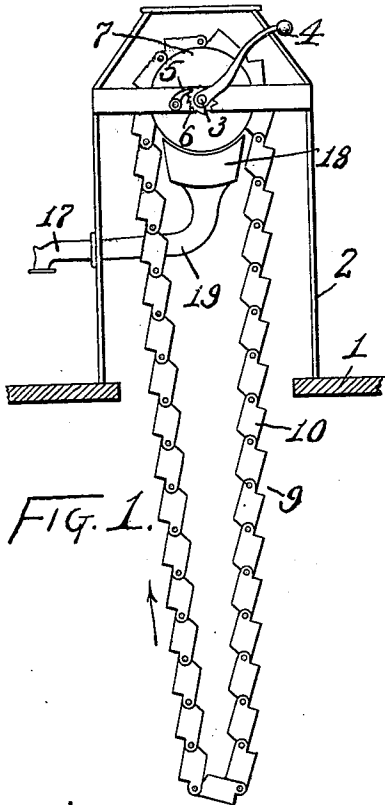


FIG. 1.

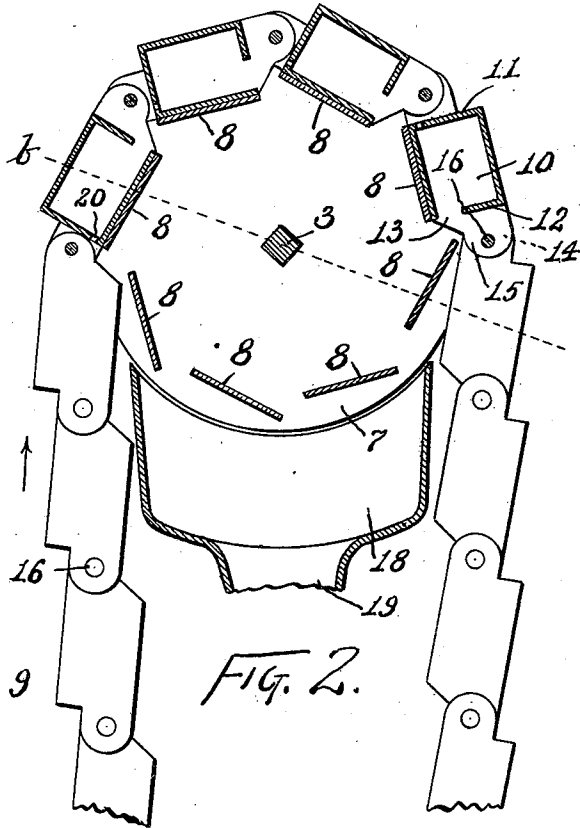


FIG. 2.

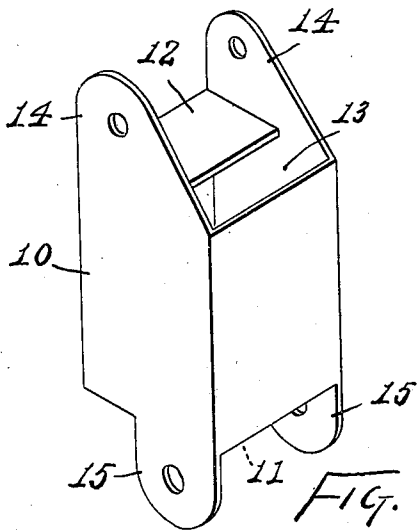


FIG. 4.

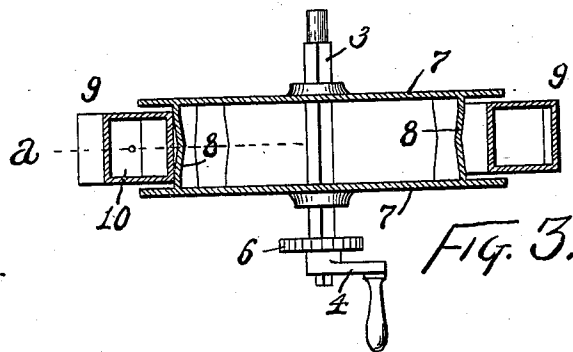


FIG. 3.

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# UNITED STATES PATENT OFFICE.

COLUMBUS HEFFNER, OF MIDDLETOWN, OHIO, ASSIGNOR, BY MESNE ASSIGNMENTS, TO HIMSELF AND THEODORE C. SIMPSON, OF SAME PLACE.

## BUCKET-CHAIN PUMP.

SPECIFICATION forming part of Letters Patent No. 645,171, dated March 13, 1900.

Application filed December 15, 1899. Serial No. 740,375. (No model.)

*To all whom it may concern:*

Be it known that I, COLUMBUS HEFFNER, a citizen of the United States, residing at Middletown, Butler county, Ohio, have invented certain new and useful Improvements in Bucket-Chain Pumps, of which the following is a specification.

This invention, pertaining to improvements in that class of pumps employing a chain of buckets operated by the top wheel, will be readily understood from the following description, taken in connection with the accompanying drawings, in which—

Figure 1 is a side elevation of a pump exemplifying my invention, the nearer side wall of the curb or stock being removed; Fig. 2, a vertical section of the top wheel and a few of the buckets, the additional buckets of the series appearing in side elevation, the section being in the plane of line *a* of Fig. 3; Fig. 3, a horizontal section in the plane of line *b* of Fig. 2 of the top wheel and contiguous buckets, and Fig. 4 a perspective view of one of the buckets.

In the drawings, 1 indicates the platform; 2, the curb; 3, the wheel-axle; 4, the crank; 5, the stop-pawl; 6, the ratchet on the axle and engaged by the pawl to prevent retreating motion of the bucket-chain, all the parts thus far referred to being as usual; 7, the two side flanges of the top wheel, the same being fast on the axle at such distance apart as to freely accommodate the width of the buckets forming the chain; 8, a circumferential series of driving-plates extending across between the flanges 7, a space being formed between the ends of contiguous plates, such spaces leading to the interior of the wheel thus formed by the flanges and the plates, the plates being preferably set tangential to the axis of the wheel, as shown, and the entire wheel being either formed in one piece or in united pieces, as desired; 9, the endless chain of buckets bending over the wheel, the lower end of the chain to extend down into the water; 10, the body of one of the buckets, the same being preferably of rectangular cross-section; 11, the bottom of the bucket when the bucket is considered as moving upwardly from the water; 12, the top of the bucket, closing only the outer portion of the upper

end of the bucket; 13, an opening at the inner portion of the upper end of the bucket for the reception and discharge of water; 14, ears projecting upwardly as extensions of the side walls of the bucket; 15, ears extending downwardly as extensions of the side walls of the bucket, the distance between the lower ears 15 of a bucket being sufficient to admit the upper ears of the succeeding lower bucket between them; 16, pivots uniting the upper and lower pairs of ears, respectively, of contiguous buckets, whereby the series of buckets is formed into a chain; 17, the spout, projecting, as usual, from the curb; 18, a pan supported within the curb below the top wheel and between the rising and falling members of the chain of buckets; 19, the conduit leading from the pan to the spout, this conduit and the spout to be arranged in construction to discharge the water at any face of the curb desired, the conduit passing to one side of the bucket-chain, so as not to interfere with its motion, and 20 air-holes in the bottom of the buckets to permit of the discharge of air as the buckets move downwardly in the water, thus allowing the buckets to fill and at the same time aerating the water.

The top wheel is to be turned to move the chain in the direction indicated by the arrow. The ascending buckets carry the water upwardly, and as they begin to turn at the top of the wheel they discharge their contents to the inside of the wheel, the water flowing from the inside of the wheel to the pan and thence out at the spout. The spaces between the ends of contiguous plates 8 permit the water to be discharged from the buckets into the wheel and permit the water to flow from the wheel into the pan. The construction permits of the buckets being extremely close together, thus providing for many buckets in the chain and for a consequent great pumping capacity. The entire contents of the ascending buckets, except the trifle draining from air-holes 20, passes into the wheel and out of the spout, there being no waste due to cataract action or splashing.

It is to be noticed that the upper ears of an ascending bucket are disposed outwardly beyond the center of the bucket, while the lower ears are disposed inwardly beyond the

center, the result being that the buckets tend to hang at an angle instead of plumb, the discharge-opening 13 being thus carried inwardly to facilitate the discharge of water 5 into the wheel and permitting the heel of one cross-plate 8 to be extended radially beyond the forward end of the immediately-following cross-plate, a liberal and properly-directing opening thus being formed for the water 10 to pass to the central chamber of the wheel.

I claim as my invention—

1. In a pump, the combination, substantially as set forth, of a top wheel having inclosing side walls and cross-plates forming a 15 wheel with a central chamber and peripheral outlets between contiguous cross-plates, a pan disposed below the wheel and adapted to receive water flowing from said central chamber, and a chain of buckets supported 20 by the wheel and adapted to dump their contents into the central chamber of the wheel through the spaces between the cross-plates thereof.

2. In a pump, the combination, substantially as set forth, of the side flanges forming inclosing side walls of the top wheel, cross-plates between the flanges and arranged to 25 produce spaces between contiguous plates and leading to the central chamber of the wheel, a chain of buckets engaging the wheel and 30 arranged to discharge their contents inwardly to the central chamber of the wheel, bucket-tops covering the outer portion of the tops of the buckets, and a pan disposed below the 35 wheel.

3. In a pump, the combination, substantially as set forth, of the side flanges forming inclosing side walls of the top wheel, cross-

plates disposed between the flanges and arranged to produce spaces between the contiguous plates and leading to the central 40 chamber of the wheel, the advance end of each plate being nearer the axis of the wheel than is the trailing end of the plate, a chain of buckets engaging the wheel and arranged to 45 discharge their contents inwardly to the central chamber of the wheel, bucket-tops covering the outer portion of the tops of the buckets, and a pan disposed below the wheel.

4. In a pump, the combination, substantially as set forth, of a top wheel having a 50 closed central chamber with peripheral passages, a series of buckets forming a chain of buckets supported by said wheel and having 55 outlets registering with said passages, intermembering ears at the tops and bottoms of the buckets, pivots uniting the ears of contiguous buckets, and a pan disposed below the wheel.

5. In a pump, the combination, substantially as set forth, of a top wheel having a central closed chamber with peripheral passages, a series of buckets forming a chain of buckets 60 supported by said wheel, pivots uniting the contiguous buckets of the series, the axes 65 of the pivots being disposed outwardly beyond the centers of the tops of the buckets and inwardly beyond the centers of the bottoms of the buckets whereby the bodies of the buckets are normally inclined from the perpendicular, and a pan disposed below the 70 wheel.

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Witnesses:

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