

(No Model.)

D. HUG.
WATER WHEEL.

No. 576,849.

Patented Feb. 9, 1897.

Fig. 5.

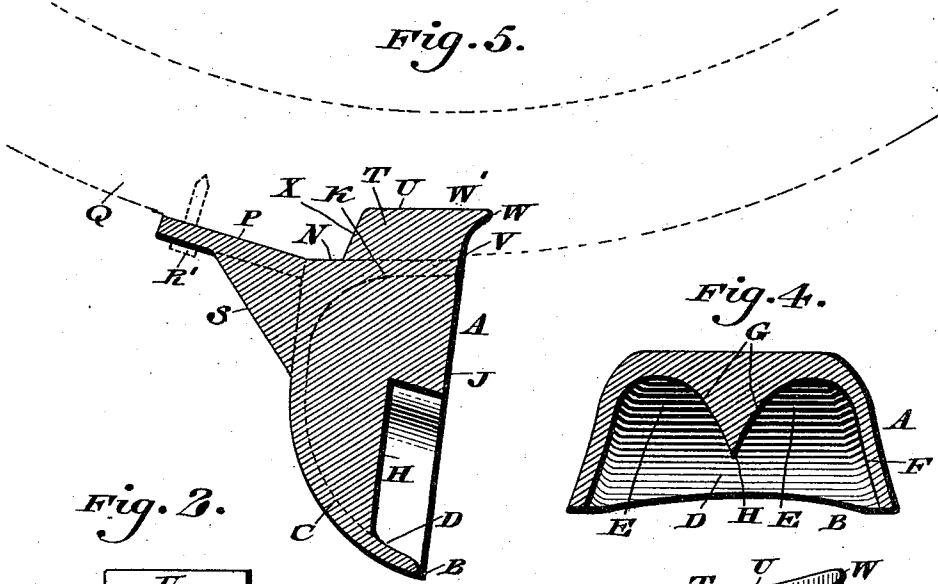


Fig. 4.

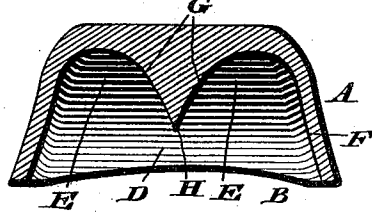


Fig. 2.

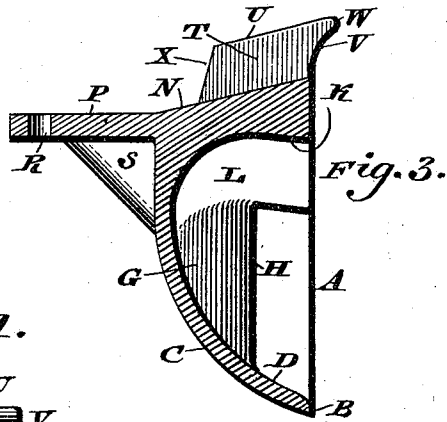
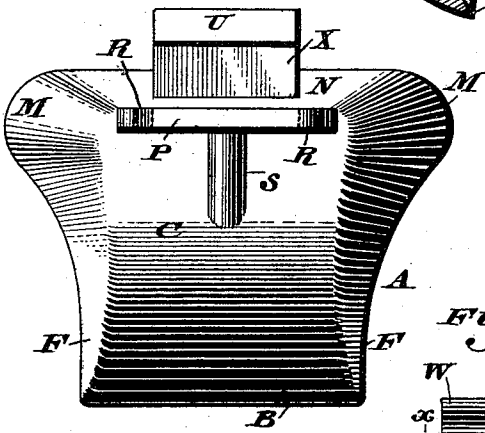
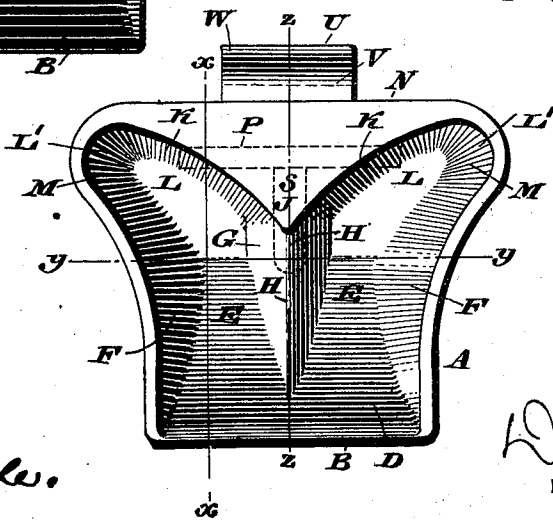


Fig. 1.



WITNESSES:

P. F. Chagler.
W. A. Seidenheim.

INVENTOR
Daniel Hug
BY Paul Seidenheim
ATTORNEY.

UNITED STATES PATENT OFFICE.

DANIEL HUG, OF DENVER, COLORADO.

WATER-WHEEL.

SPECIFICATION forming part of Letters Patent No. 576,849, dated February 9, 1897.

Application filed December 5, 1896. Serial No. 614,553. (No model.)

To all whom it may concern:

Be it known that I, DANIEL HUG, a citizen of the United States, residing at Denver, in the county of Arapahoe, State of Colorado, have invented a new and useful Improvement in Water-Wheels, which improvement is fully set forth in the following specification and accompanying drawings.

My invention relates to water-wheels; and it consists more especially in an improved construction of bucket therefor, in which the lower wall is given a continuous curvature or arc shape throughout substantially its entire length, so as to facilitate the discharge of the water from the side chambers of the bucket, thereby reducing to a minimum all possibility of foaming and at the same time cushioning the motive fluid and causing all the latter to be discharged in a solid stream at either side of the bucket.

It also consists of an improved construction of fastening device whereby buckets of large dimensions can be expeditiously and rigidly attached to the rim of the water-wheel.

It further consists of novel details of construction, all as will be hereinafter fully set forth, and specifically pointed out in the claims.

Figure 1 represents a front elevation of a bucket embodying my invention. Fig. 2 represents a rear elevation of the bucket. Fig. 3 represents a section on line *xx*, Fig. 1. Fig. 4 represents a section on line *yy*, Fig. 1. Fig. 5 represents a section on line *zz*, Fig. 1. Similar letters of reference indicate corresponding parts in the several figures.

Referring to the drawings, A designates my improved construction of bucket, the same having the lower front wall or edge B, from which extends the rear wall C, to which latter is given a curvature or arc shape, thereby imparting to the portion D, at or near which the incoming fluid first strikes, a continuous rounded surface, whereby all obstruction to the discharge of water from the bucket is prevented and friction is reduced to a minimum.

E designates chambers, located side by side, which are formed between the flaring side walls F of the bucket and the converging centrally-located walls G, which meet to form the apex H, the latter being a short distance from the outer line of the bucket within

the latter, as will be evident from Figs. 3, 4, and 5.

J designates a substantially centrally-located V-shaped wall, the sides K of which assist to form the chambers L of the bucket, said chambers being located in the upper portion of the latter and forming a continuation of the chambers E and having their sides flaring outwardly, as indicated in Fig. 1, the flaring outer walls M of the bucket being located oppositely to the sides K, and thus giving to the chambers L the desired contour, it being noted that the outlet L' of each of said chambers is slightly contracted and curved, so that the full effect of the impinging fluid is obtained.

N designates the top of the bucket, which in the present instance slopes from front to rear, as indicated in Figs. 3 and 5, the top surface of the bucket being continued to form the plate P, which is attached to the top M substantially at an obtuse angle in the present instance, said plate being adapted to contact with the outer periphery of the rim Q of the water-wheel, as indicated in Fig. 5.

R designates openings in said plate for the insertion of a screw, bolt, or other suitable fastening device R'.

S designates a strengthening-rib common to the rear curved wall C of the bucket and the plate P.

T designates a lug or tenon which projects from the top M of the bucket, the top of said tenon in the present instance being inclined at substantially the same angle as the top N, although, of course, this degree of inclination can be varied, if desired. The front wall of said tenon T is provided with a curvature V, whereby an overhang or lip W is produced, the rear of said tenon having the inclined face X, it being of course understood that the tenon T is adapted to seat in a similarly-shaped recess W' in the rim Q of the water-wheel, as indicated in Fig. 5.

The operation is as follows: The incoming fluid is received in the lower portion of the chambers E and discharged at the points L' from the upper chambers L, the general operation being substantially the same as that described in a contemporaneously pending application filed by me on the 1st day of October, 1896, Serial No. 607,529, the special

feature to which it is desired to direct attention in the present instance being the continuous uniform curvature given to that portion D of the wall C upon which the actuating fluid first impinges. The bucket is secured in position by inserting the tenon T in the proper recess, it being of course understood that there are as many recesses in the rim of the water-wheel as there are buckets to be carried thereby, the said tenon being first inserted in place and then moved forwardly until the lip W is in contact with the adjacent surface, against which it is driven by the inclined edge X of the tenon when the plate P is forced in place in the act of fastening, the plate P being then secured by means of the fastening device R' to the rim of the wheel, it being thus apparent that the bucket after being secured in position is rigid in place and cannot be moved sidewise, laterally, or in any other direction, the above manner of fastening being used on very large buckets in which the tenon would be too wide to pass through the rim of the wheel without dangerously weakening the same.

It will of course be understood that slight changes may be made by those skilled in the art which will come within the scope of my invention, and I do not therefore desire to be restricted in every instance to the exact construction I have herein shown and described.

I disclaim a bucket having a plurality of diverging chambers and a V-shaped wall, the sides of which assist in forming the said chambers, which latter discharge at opposite sides of said bucket, as the same forms the subject-matter of the claims of the pending application, hereinbefore referred to.

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

1. In a water-wheel, a bucket having a plurality of diverging chambers, the upper portion of said bucket having a V-shaped wall therein, the sides of which wall assist in forming said chambers, which latter discharge at opposite sides of said bucket, and the walls of said chambers upon which the incoming fluid first impinges being provided with a curvature throughout their length.

2. In a water-wheel, a bucket having a plurality of diverging chambers, the upper portion of said bucket having a V-shaped wall therein, the sides of which wall assist in forming said chambers, which latter discharge at opposite sides of said bucket, the rear wall of the lower portion of said chambers being provided with a continuous curvature, whereby foaming is obviated, and the incoming fluid is cushioned, and means for attaching said bucket to a water-wheel.

3. In a water-wheel, a bucket having a tenon attached to the top thereof, said tenon being provided with a forwardly-projecting lip, and

said bucket having a rearwardly-projecting plate adapted to be attached to the exterior periphery of the water-wheel.

4. In a water-wheel, a bucket having a plurality of diverging chambers, the upper portion of said bucket having a V-shaped wall therein, the sides of which wall assist in forming said chambers, which latter discharge at opposite sides of said bucket, and the top of the latter being inclined and provided with a tenon attached thereto, said tenon having an inclined top and rear wall, and a forwardly-projecting lip in combination with a rearwardly-extending plate, the latter being adapted to be attached to the outer periphery of said water-wheel, and said tenon being adapted to be seated in a recess in the rim of said wheel.

5. In a water-wheel, a bucket having a plurality of diverging chambers, the upper portion of said bucket having a V-shaped wall therein, the sides of which wall assist in forming said chambers, which latter discharge at opposite sides of said bucket, the rear wall of each of said chambers being provided with a continuous curvature at that point upon which the actuating fluid first impinges, a tenon attached to the top of said bucket, and provided with a forwardly-projecting lip, a plate projecting rearwardly from the upper portion of said bucket, and a strengthening-rib common to the latter and said plate.

6. In a water-wheel, a bucket A having a plurality of chambers E therein, the walls F, G, of said chambers diverging outwardly, and the rear wall C of said chambers being provided with a continuous curvature at about the point where the incoming stream first impacts therewith, a V-shaped wall J located in the upper portion of said bucket, the chambers L, the sides of said V-shaped wall assisting in forming said latter chambers, the same being provided with curved and contracted outlets, the tenon T attached to the top of said bucket and provided with an inclined top, and having the rear walls U and X respectively, and the curved front wall V and the lip W, the rearwardly-extending plate P attached to the upper portion of said bucket and extending at an obtuse angle to the top of the latter, the strengthening-ribs S common to said plate and bucket and means for attaching the latter to a water-wheel.

7. In a water-wheel, a bucket, means for attaching the latter to said wheel, said means consisting of the forwardly-projecting tenon and a rearwardly-projecting plate, said tenon being adapted to enter the rim of said wheel, and said plate being adapted to contact with the outer portion thereof.

DANIEL HUG.

Witnesses:

J. E. CRANE,
FRANK A. AICHER.