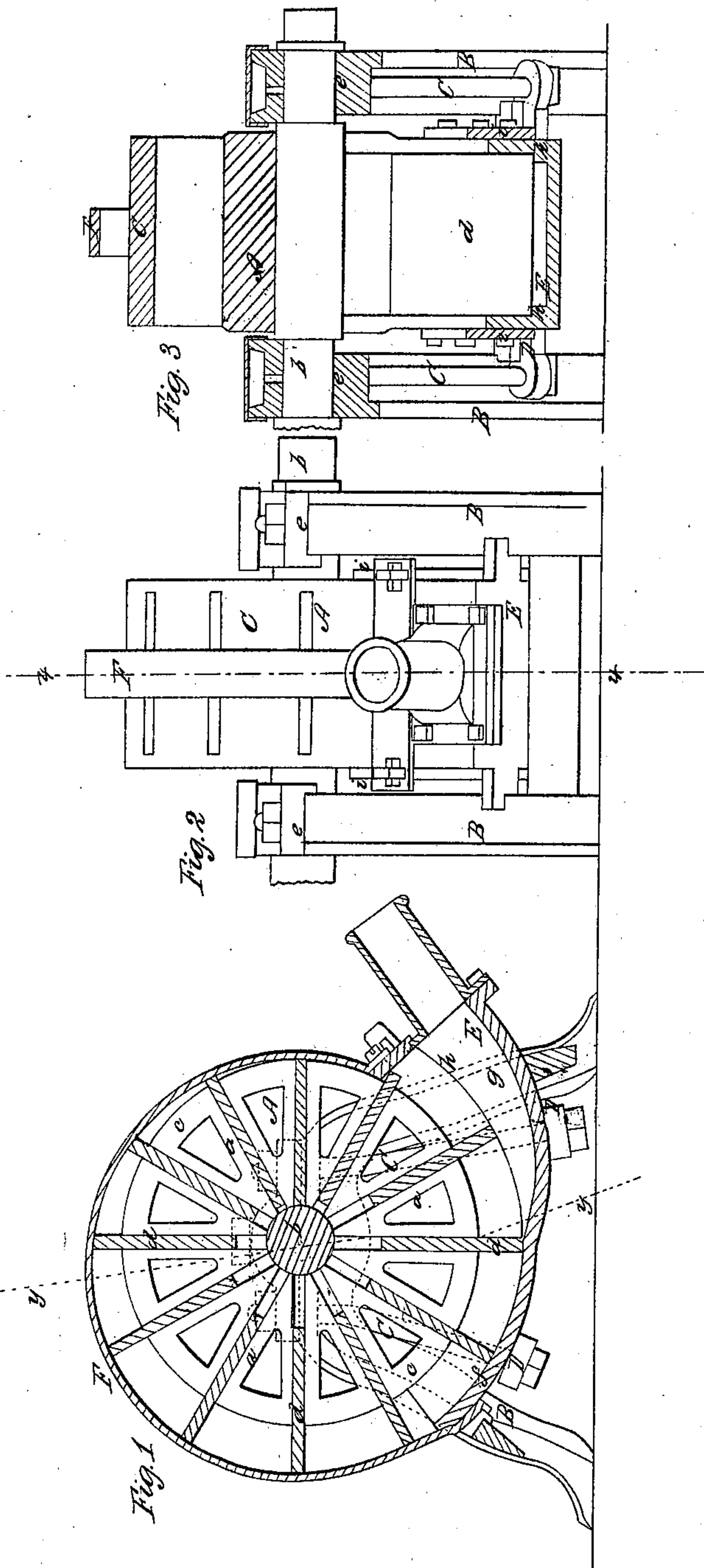


*Fredenburr & George,*

Water Wheel,

N<sup>o</sup> 34,485.

*Patented Feb. 25, 1862.*



Witnesses;  
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# UNITED STATES PATENT OFFICE.

J. G. FREDENBURR AND J. L. GEORGE, OF COLUMBIA, CALIFORNIA.

## IMPROVED WATER-WHEEL.

Specification forming part of Letters Patent No. 34,485, dated February 25, 1862.

*To all whom it may concern:*

Be it known that we, J. G. FREDENBURR and J. L. GEORGE, of Columbia, in the county of Tuolumne and State of California, have invented a new and Improved Water-Wheel; and we do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the annexed drawings, making a part of this specification, in which—

Figure 1 is a side sectional view of our invention, taken in the line *x x*, Fig. 2; Fig. 2, a front view of the same; Fig. 3, a section of the same, taken in the line *y y*, Fig. 1.

Similar letters of reference indicate corresponding parts in the several figures.

To enable those skilled in the art to fully understand and construct our invention, we will proceed to describe it.

A represents the wheel, which may be constructed of metal and formed of radial arms *a*, fitted to a shaft *b* and having their outer ends connected by a rim *c*. The arms and rim are cast in one piece, and the arms are cast hollow, so as to admit of a bucket *d* being fitted in each, said buckets being simply rectangular plates extending nearly the whole width of the wheel and allowed to slide freely into and out from the arms *a* through the rim *c*.

The bearings *e* of the shaft *b* are on suitable standards B B, from the upper parts of which rods C depend—two from each standard—and to the lower ends of these rods cross-bars D are secured, said bars forming rests or supports for a chute E, which fits snugly or water-tight to the lower part of the wheel. The chute E is of curved form, the back part *f* corresponding to the curvature of the wheel, while the front part *g* extends down deeper, as shown clearly in Fig. 1, and at the sides of said part *g* there are ledges *h h*—one at each side—said ledges being concentric with the wheel A and the back part *f* of the chute. The chute E has a plate *i* attached to each side of it, (see Fig. 3,) and these plates form guides for the wheel to fit between and also form a close joint. The chute E, it will be understood, is stationary.

F is a curved bar, the ends of which are secured to the ends of the chute E. This bar forms a part of a circle, and it encompasses the wheel A eccentrically, as shown clearly in Fig. 1, the front lower part of the bar being in contact with the periphery of the wheel, and the bar gradually receding from the wheel from its front to back end.

The operation is as follows: The water enters the front part of the chute E and acts against the buckets *d* and rotates the wheel A, the water passing out at the back part of the chute. As the buckets leave the back end of the chute they are forced inward by the bar F, and as they pass down below the front end of bar F they drop down on the ledges *h h* and are exposed to the action of the water. By this arrangement the water is used in the most economical way possible. The front part *g* of the chute, in consequence of being deeper than the back part *f*, admits of the water acting by impact on two buckets simultaneously, and the water as it passes from the back end of the chute has its force expended on the buckets, or as much of it as is practicable or advantageous to expend, for if the chute be too long the water will serve as a "drag" on the wheel and detract materially from its maximum effect. The chute should be of sufficient length to admit of four buckets being in it at once. (See Fig. 1.)

There is another important feature connected with this invention—to wit, the enabling of the wheel to be used under any head. It will be seen that the chute E does not perform the function merely of the "apron" or guide of the ordinary "undershot" wheel, but serves as portion of a scroll and confines the water to the under part of the wheel, so that water can be admitted into the chute under any pressure. The wheel therefore is rendered available for general purposes and possesses a great advantage over the undershot wheel, which hitherto has been used only under a small head of water.

We do not claim, broadly, the use of sliding buckets; but,

Having thus described our invention, what

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

1. The arrangement of the ledges *h* and the guide-plates *i* with the sliding buckets *d*, chute *E*, and its enlargement *g*, as herein shown and described.

2. The arrangement of the encompassing

bar *F* with the buckets *d* and the chute *E*, as herein shown and described.

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