

W. H. Willard.
Screw Propeller.

N^o 36,492.

Patented Sept. 10, 1862.

Fig. 2.

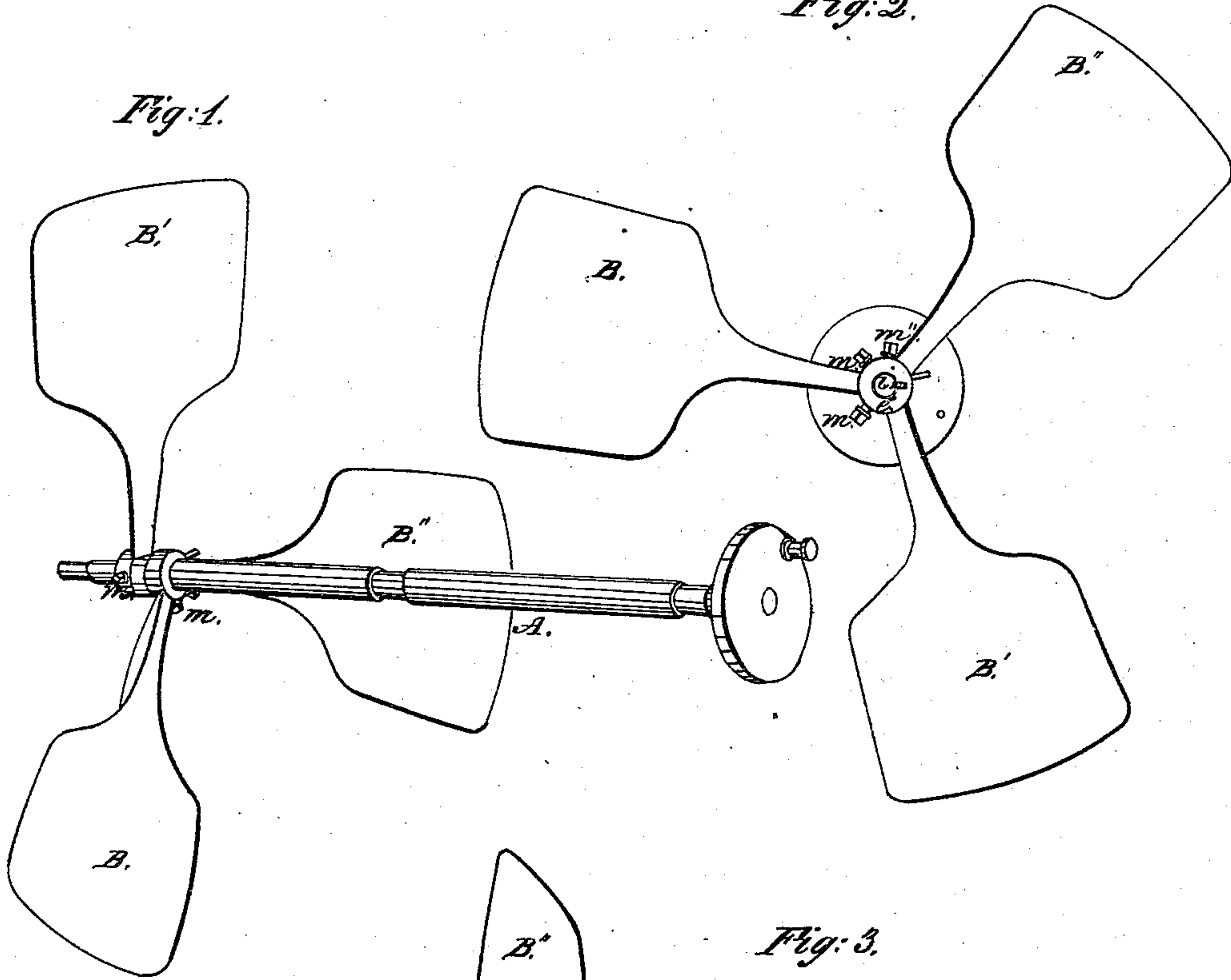


Fig. 3.

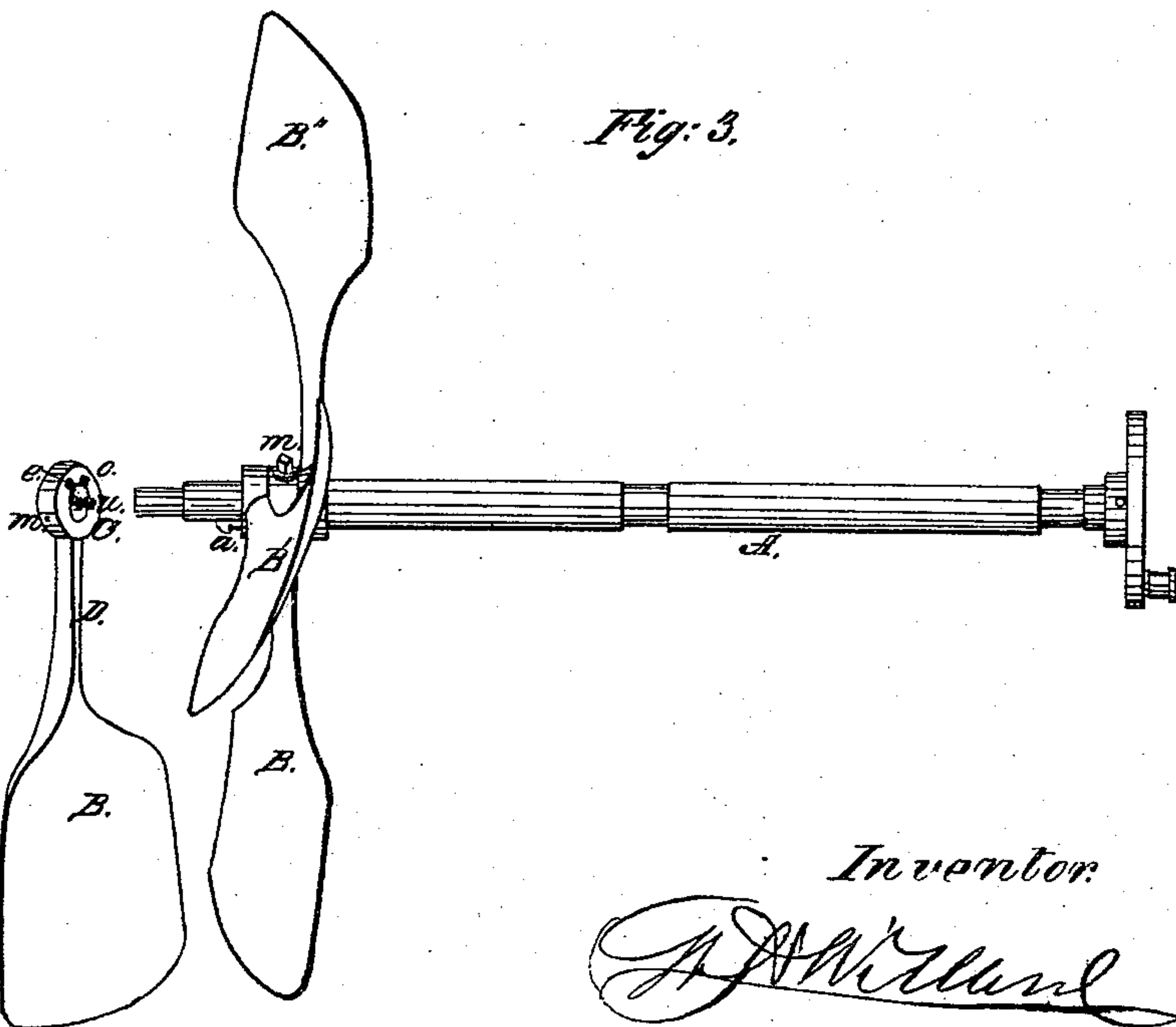


Fig. 4.

Witnesses.
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UNITED STATES PATENT OFFICE.

W. H. WILLARD, OF CLEVELAND, OHIO.

IMPROVED MARINE PROPELLER.

Specification forming part of Letters Patent No. 36,492, dated September 16, 1862.

To all whom it may concern:

Be it known that I, W. H. WILLARD, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented new and useful Improvements in Propeller-Wheels; and I do hereby declare that the following is a full and complete description of the construction and operation of the same, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a perspective view. Fig. 2 is an end view. Fig. 3 is a side view, and Fig. 4 is a single bucket detached.

My improvement embraces three points of novelty:

First. Making the wheel in sections of one bucket each.

Second. Making the buckets adjustable on the shaft, so that four, three, or two may be used and so adjusted as to balance each other. For example, if the wheel is originally composed of four buckets, and one of them should become accidentally broken, the remaining three could be adjusted to the position seen in Fig. 2; or in case of necessity, should there be but two remaining buckets, these could be adjusted to opposite sides of the shaft, so that the wheel would balance.

Third. The means of adjustment, which are such that these changes can be made either at sea or in port without going into dry-dock.

A in Figs. 1 and 3 represents the shaft, which is of the ordinary construction. A key-seat, *i*, Fig. 2, is cut upon the shaft, as usual, for the purpose of securing the various sections of the wheel, as hereinafter specified, by means of the key *a*, Fig. 3.

The buckets B B' B'' are made each separate from the other, as seen in Fig. 4. The face of the bucket has an increasing curve, as seen in Fig. 3, B'; but I lay no claim to this feature. The whole bucket may be made of cast or wrought metal. I much prefer the latter, as

much greater strength can be obtained with less weight of material. The head or hub C is fitted to pass over the shaft, and in it (the hub) is cut two or more key-seats in such position that the same key will fit the seat in both the shaft and hub, whether the adjustment is for two, three, or four buckets, as seen at *e o u* in Fig. 4. In addition to these, there is a set-screw, *m*, fitted to each of the hubs C, which, when screwed down upon the shaft, aids in holding the bucket in place. The arm D of the bucket is a triangular oval, so formed as to offer the least possible resistance to its passage through the water.

Now, suppose a wheel to be constructed with three buckets, and when upon a voyage one of them, B'', Fig. 2, should become accidentally broken, it would become desirable and necessary, in order to secure the correct working of the engine and the greatest speed, to adjust the bucket B' upon the shaft so that it be opposite to the bucket B, and by means of my improvement this could be accomplished even with the shaft below water. By loosening the set-screw *m'* and withdrawing the key *a* the bucket B' can be easily adjusted to its desired position. The set-screw can be again tightened and the key driven in, which would now fit into the seat *e*, Fig. 2, in the hub of the bucket.

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

1. Making the hub in sections corresponding in number to the number of buckets, each bucket and its section of hub being united and forming one piece, as herein described.

2. So arranging the key-seats in the respective sections of the hub that these may be adjusted in sets of four, three, or two, as and for the purpose herein set forth.

W. H. WILLARD.

Witnesses:

W. H. BURRIDGE,
J. BRAINERD.