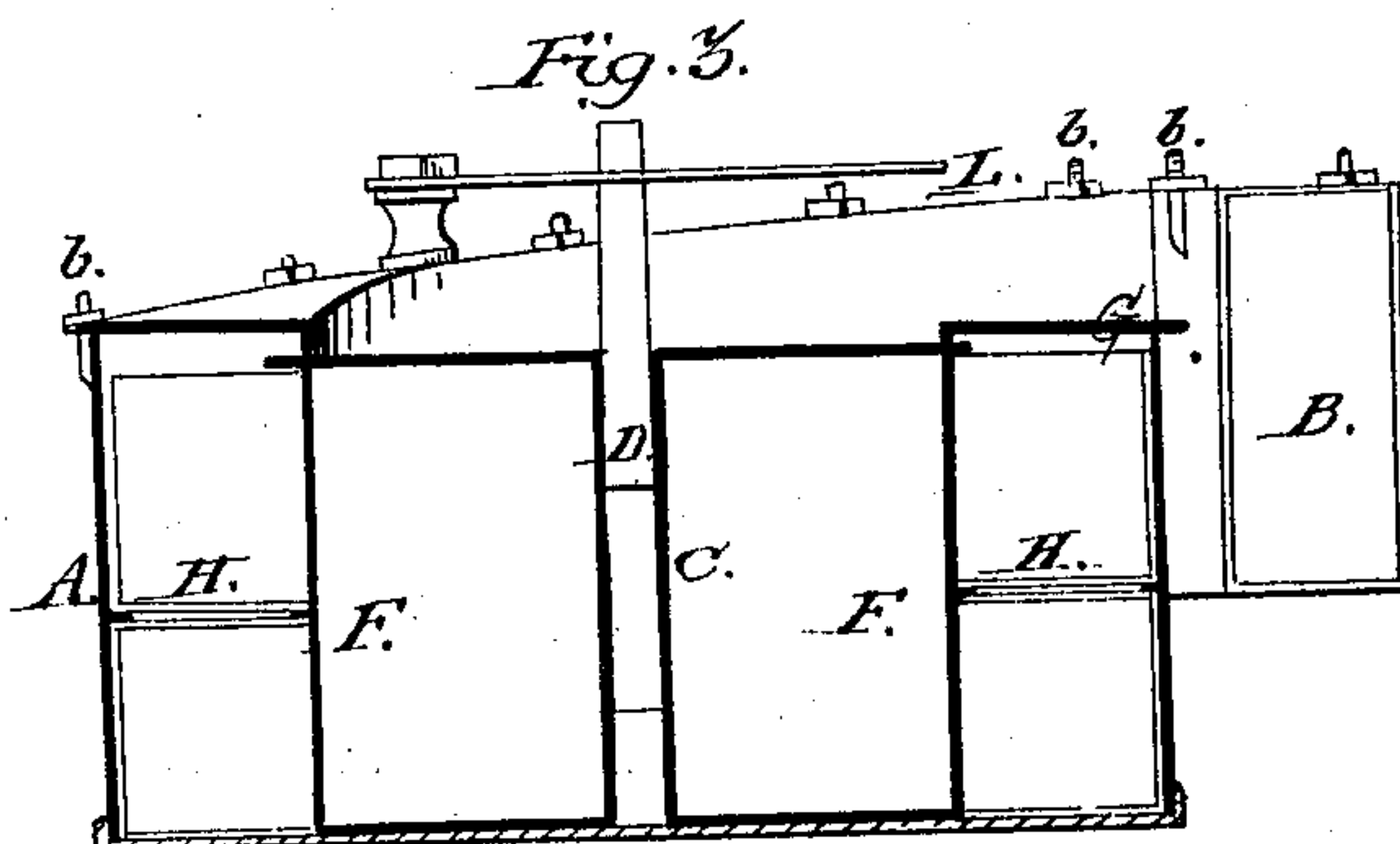
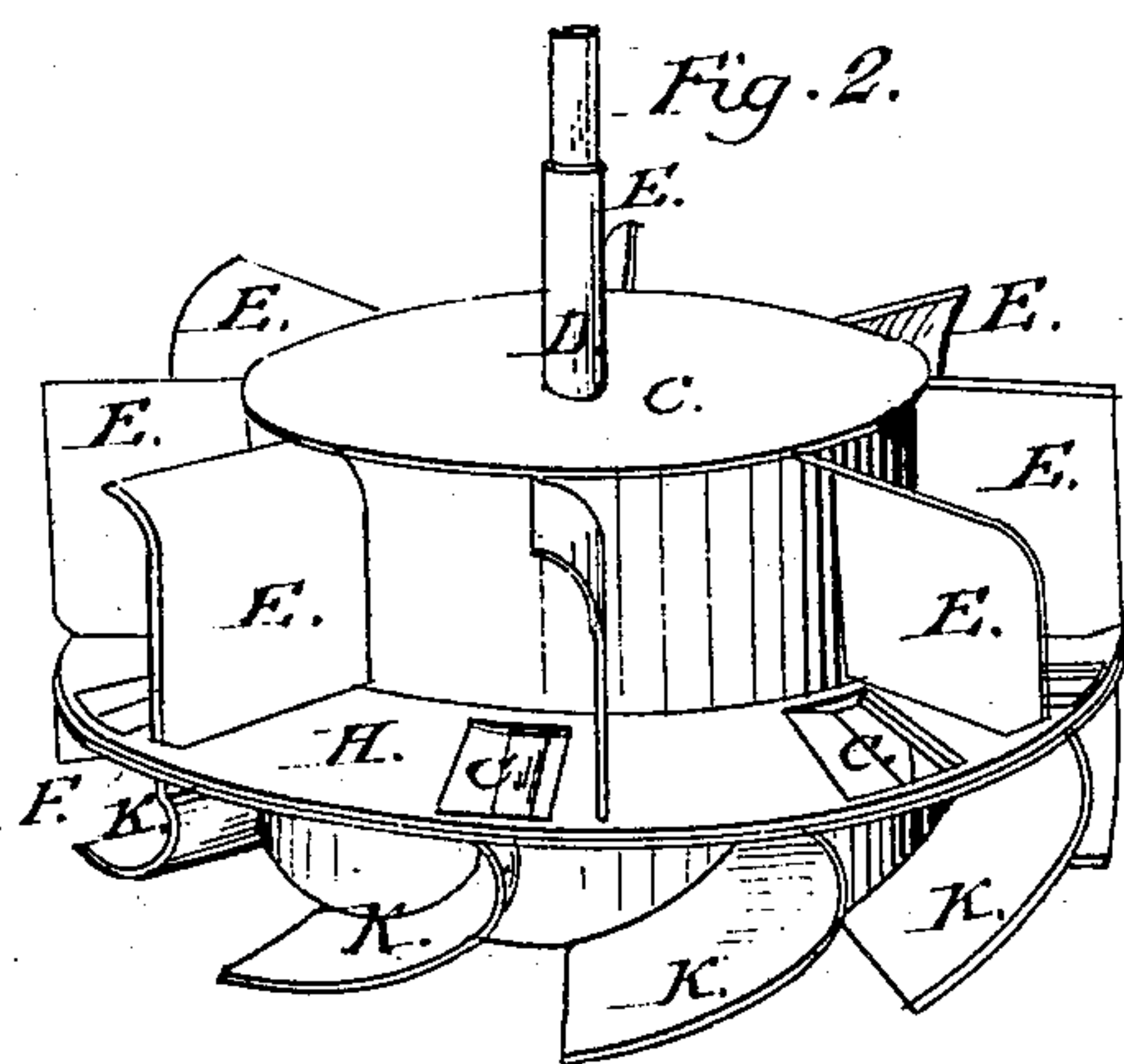
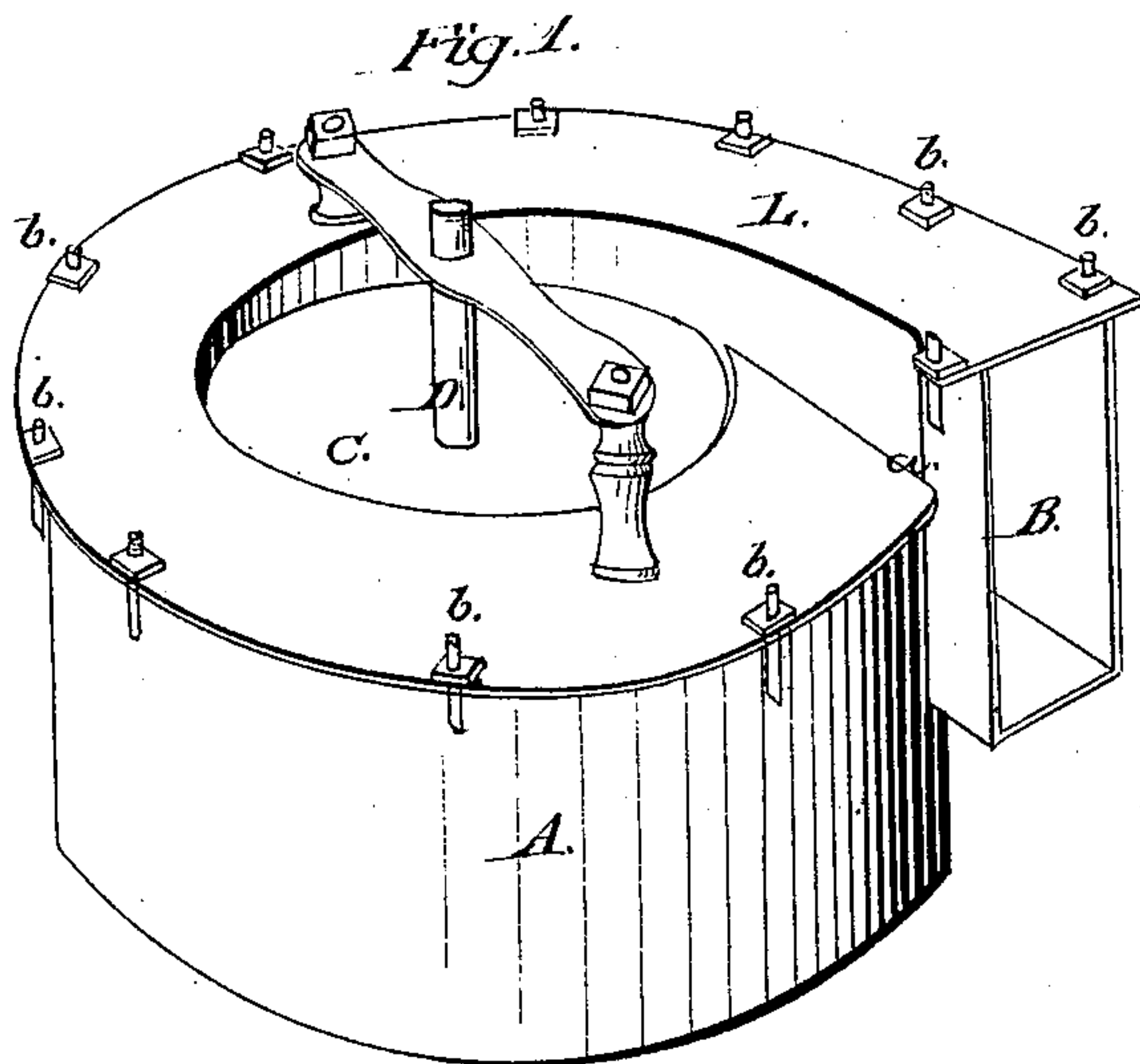


J. W. Glendinning,

Water Wheel.

No. 101,996.

Patented Apr. 19, 1870.



WITNESSES:

H. F. Phelps
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D. W. GLENDINNING, OF DETROIT, MICHIGAN.

Letters Patent No. 101,996, dated April 19, 1870.

IMPROVEMENT IN TURBINE WATER-WHEELS

The Schedule referred to in these Letters Patent and making part of the same

To whom it may concern:

Be it known that I, D. W. GLENDINNING, of Detroit, in the county of Wayne and State of Michigan, have invented a new and useful Improvement in Turbine Water-Wheels; and I do declare that the following is a true and accurate description thereof, reference being had to the accompanying drawings and to the letters of reference marked thereon and being a part of this specification.

Figure 1 is a perspective view of the case, shell, or scroll, and its attachments.

Figure 2 is a perspective of my wheel, with case, shell, or scroll removed.

Figure 3 is a vertical section, taken on a line intersecting the opening into the shell.

Like letters indicate like parts in each figure.

The nature of this invention relates to certain improvements in that class of water-wheels known as turbine wheels; and consists—

First, in the arrangement of the several parts of the shell or case;

Second, in the peculiar arrangement of the buckets, there being a greater number of buckets in the lower than in the upper series;

Third, in a solid and rigidly-affixed deck, filling the entire space between the hub of the wheel and the inner walls of the scroll, and interposed between the upper and lower series of buckets, and having openings therein between each of the buckets in the upper series, through which openings the water will descend after operating upon said series of buckets;

Fourth, in another deck similarly constructed, but not rigidly secured, but so arranged that it may be rotated, so that the openings therein will correspond with the openings in the rigid deck, when required, or that, when less water is used or desired to be used, it will partially cut off the water by interposing a portion of its solid face over said openings in the rigid disk; and

Fifth, in the new and novel arrangement of its various parts, the whole being designed to utilize the whole of the water entering the scroll, and constructing a wheel that can be used to great advantage where but little water can be made available.

In the accompanying drawings—

A represents the case, shell, or scroll, provided with an opening or throat, B, the base of which is upon the same plane with the deck which divides the upper from the lower tier or series of buckets, while its top is elevated above the plane of the top of the upper series of buckets at and near said throat, and inclines downward in a spiral form until it meets the side of the throat at *a*, where the top terminates upon the plane of the top of the upper series of buckets.

C is a hub, secured to and rotating with the vertical shaft D, which is supported in the usual way.

E is the upper series of buckets, of which there are eight in number, and are rigidly secured, in a vertical position, to the periphery of the hub C. It will be noticed, in fig. 2, that for a short distance the tops of these buckets are curved, in order the better to retain their hold upon the water, which, entering the throat B, acts directly upon them. The buckets are secured, at equal distances from each other, to the hub.

F is a deck, entirely filling the space between the hub and the inner wall of the shell, being rigidly secured immediately below the lower ends of the upper series of buckets.

This deck is provided with openings, G, at equal distances apart, through which the water falls after acting upon the upper series of buckets.

H is another deck, constructed precisely like the deck F, and provided with similar and corresponding openings. This deck, however, is not rigidly secured, but is loosely placed above the deck F, and may be provided with any suitable mechanism by which it may be rotated, so that, when desired, it will partially or entirely close the openings G in the rigid deck, as hereinbefore described.

K is the lower series of buckets, curved, as shown in fig. 2, and rigidly secured to and rotating with the hub C, in such a manner that the weight of the water acts upon them, and then is discharged vertically.

When it is desired to repair the wheel, the top L of the case may be removed by unscrewing the nuts *b*, by means of which it is secured, when the wheel may be lifted out of the case, if necessary.

It will be seen that, by the construction of a wheel and case as above described, the water acts directly upon the buckets E, then, falling through the openings G in the decks F and H, reacts upon the buckets K, and is then vertically discharged.

Should the stream be full and completely fill the area of the throat, there would be more water than would be necessary to act upon the first buckets presented to it; consequently some portion of the water, corresponding to the area of the opening G, would pass through said opening and react upon one of the buckets K, while another portion of the water would pour over the top of the bucket E, and act upon that in a similar manner, the incline of the top L being such as to prevent the possibility of any of the water from rushing clear round the hub C, and any back action which might be occasioned thereby. All the water must be utilized in this wheel, which enters its throat before it is discharged.

Should the stream be small, and the supply insufficient, the openings G may be partially closed, there-

by getting a full action upon the upper tier of buckets before the water will pass to the lower buckets.

Should it be desired to stop the wheel, it may be done by causing the deck H to rotate until the openings G are entirely closed.

When I employ eight buckets in the upper series, I use ten, or even more, in the lower series, that the water, after its passage through the openings G, may have the less chance of escape at the bottom of the wheel before exerting its force upon said lower series of buckets.

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

1. The rigid deck F and rotating deck H, when interposed between the upper and lower series of buckets, and operating as herein set forth.

2. The arrangement of the buckets E and K and hub C, with reference to each other, there being a

greater number of buckets in the lower than in the upper series, as herein specified.

3. The combination of the case A, hub C, shaft D, buckets E K, and decks F H, when constructed and operating substantially as herein described.

4. The volute shell A, with channel of uniform size, provided with throat B, having its base in the same plane as the deck H, and its top elevated above the top of the hub C, and inclining downward until it terminates at the inner side of said throat B, at which point its top is in the plane of the top of said hub C, constructed and arranged as above shown and set forth.

D. W. GLENDINNING.

Witnesses:

H. F. EBERTS,
JAS. I. DAY.