R. Bell.

Paddle Wheel.

No. 78,415. Patented Jun. 2, 1868.

Fig: 1.

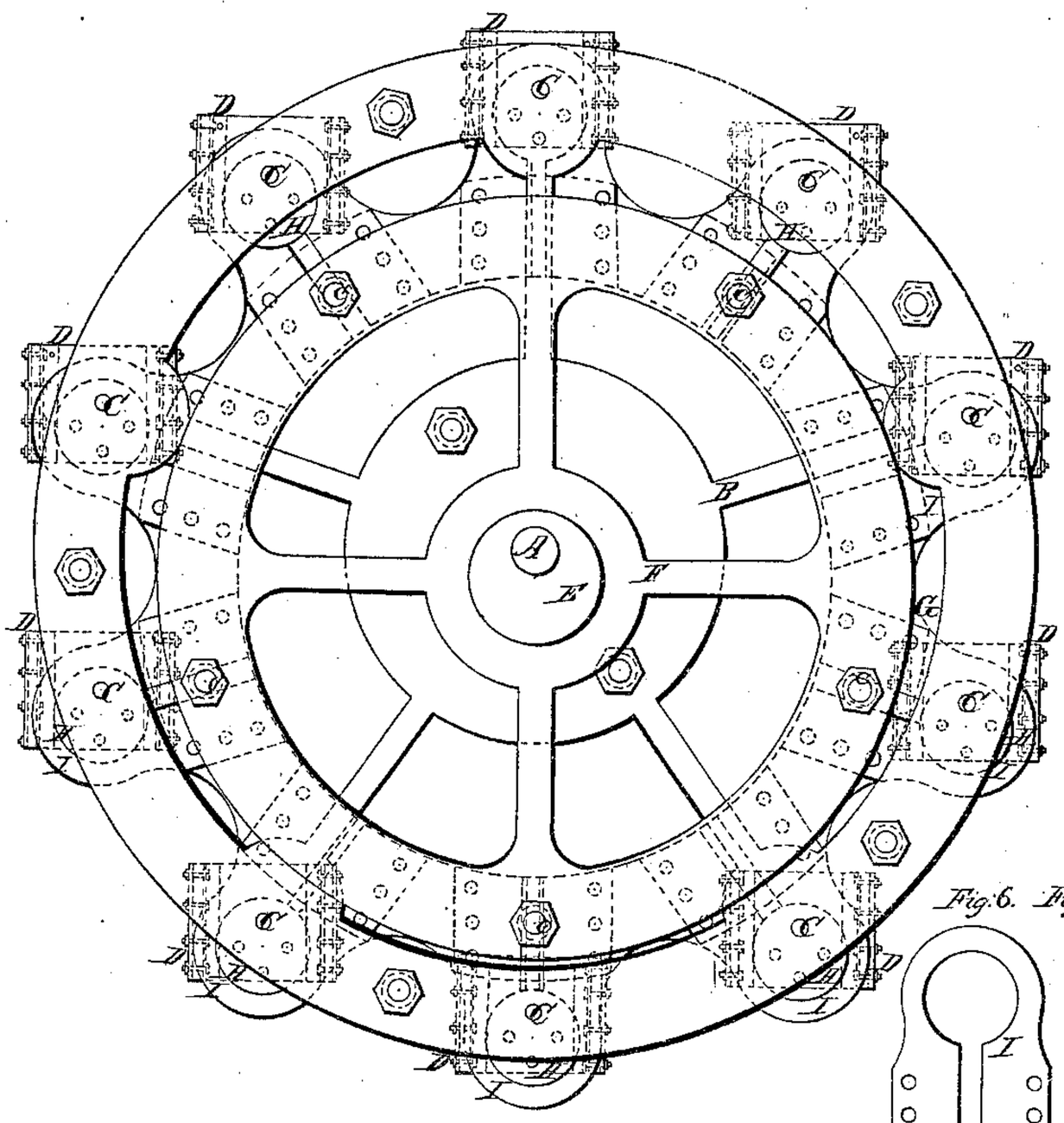


Fig: 2.

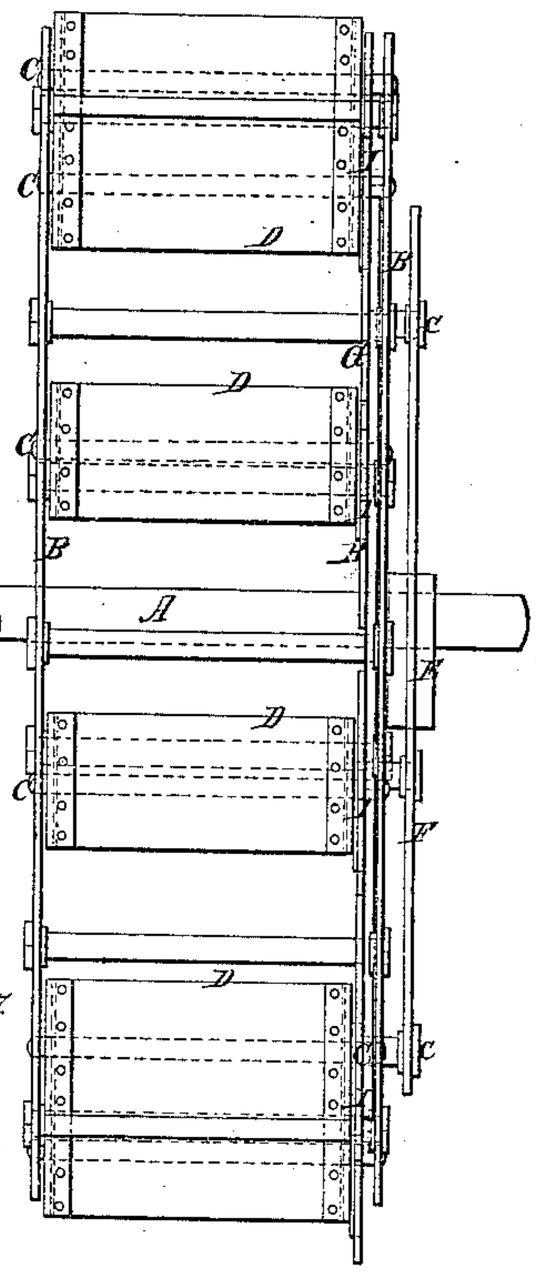


Fig: 6.

Fig: 7.

Fig: 3.

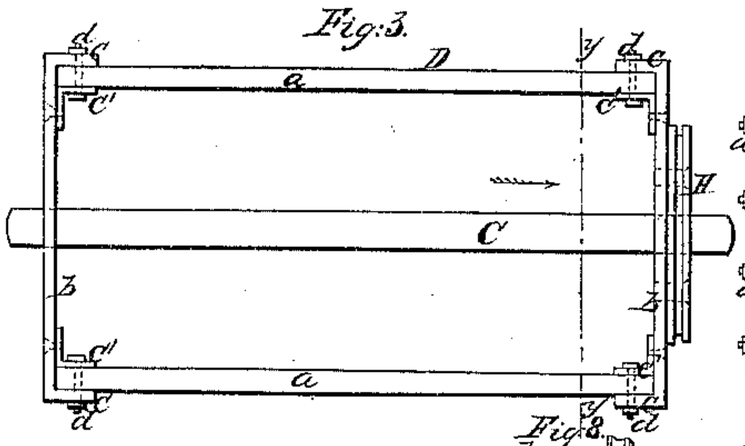


Fig: 4.

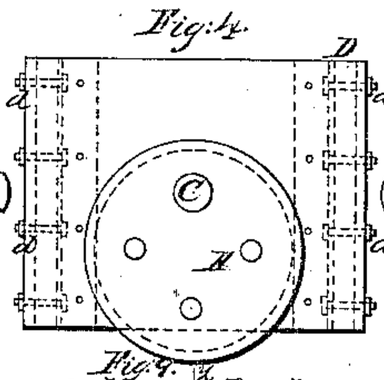


Fig: 5.

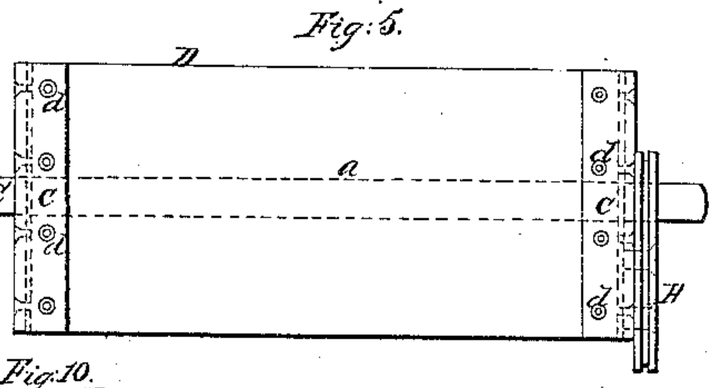


Fig: 8.

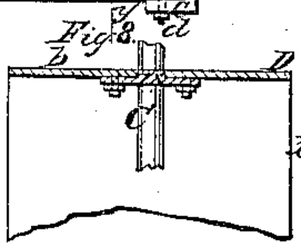


Fig: 9.

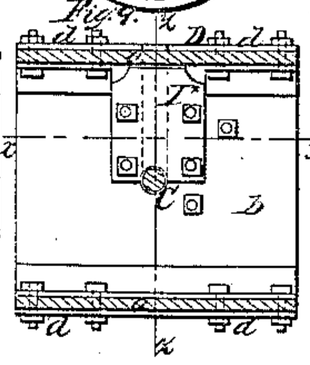
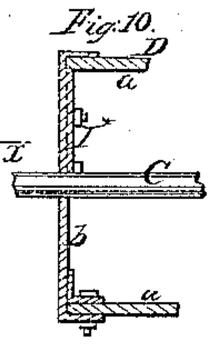


Fig: 10.



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ROBERT BELL, OF EAST SAGINAW, MICHIGAN.

Letters Patent No. 78,415, *dated June* 2, 1868.

IMPROVEMENT IN FEATHERING PADDLE-WHEELS.

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

TO ALL WHOM IT MAY CONCERN:

Be it known that I, ROBERT BELL, of East Saginaw, in the county of Saginaw, and State of Michigan, have invented a new and improved Paddle-Wheel; and that the following description, taken in connection with the accompanying drawings, hereinafter referred to, forms a full and exact specification of the same, wherein I have set forth the nature and principles of my said improvements, by which my invention may be distinguished from all others of a similar class, together with such parts as I claim, and desire to have secured to me by Letters Patent.

This invention relates to a new and improved paddle-wheel, of that class in which feathering-buckets are employed in order to avoid the jars and concussions caused by the plunge of the fixed radial buckets of ordinary wheels into the water at the front or descending side, and to avoid the loss of power caused by said buckets lifting the water as they pass out from it at the rear or rising side of the wheel.

My invention consists in the employment or use of double buckets, and in a novel arrangement and mode of feathering the same, whereby it is believed that a superior wheel of the class specified is obtained.

In the accompanying sheet of drawings—

Figure 1 is a side view of a paddle-wheel constructed according to my invention.

Figure 2, an end view of the same.

Figures 3, 4, and 5, detail views of a bucket pertaining to the same.

Figures 6 and 7, detached views of a part which connects the buckets with the feathering-rim.

Figure 8, a section of a portion of a bucket, taken in the line *x x*, fig. 9.

Figure 9, a section of a bucket taken in the line *y y*, fig. 3.

Figure 10, a section of a bucket taken in the line *z z*, fig. 9.

Similar letters of reference indicate like parts.

A represents the shaft of the paddle-wheel, and B B are the two sides of the wheel, which are firmly keyed on the shaft A, and have the axes, C, of the buckets secured in their rims, at suitable and equal distances apart.

The axes, C, of the buckets are designed to be fixed, and the buckets, D, placed loosely upon them. The buckets are composed of two parallel pieces, *a a*, which may be of wood, and constitute their face-sides, and said pieces are connected at their ends by metal plates *b b*, the space between the faces or parallel pieces *a a* of the buckets being about equal to the depth of said pieces. E is an eccentric, secured to the side of the vessel, and fitting loosely upon the shaft A. On this eccentric a circular plate, F is fitted. This plate F may be of skeleton-form, as also may be the sides B B of the wheel, and to the rim of the circular plate F there is attached, by bolts *c*, a rim, G, as shown in figs. 1 and 2.

To the inner end-plates *b* of the buckets D there are secured eccentrics, H, one to each bucket, (see more particularly fig. 4,) and on these eccentrics there are fitted eyes, I, (see more particularly figs. 6 and 7,) which are bolted to the rim G, as indicated by the dotted lines in fig. 1.

The eccentricity of the rim G, with the sides B B, of the wheel, in connection with the eccentrics H at one end of the buckets, and the fitting of said eccentrics in eyes, I, which are attached to the rim G, causes the buckets, as the wheel rotates, to turn or "feather" in such a manner that the buckets will enter the water with their faces *a a* in a vertical position, and also leave the water in the same position, thereby avoiding the jars, and concussions, and "lift," attending the operation of the ordinary paddle-wheels, which are provided with fixed radial buckets.

I would remark that the rim G might be constructed in such a manner as to admit of the eccentrics H being fitted directly in it, but the eyes I are preferable, as they admit of an individual bucket being removed or detached from the wheel for repairs, without disturbing any of the others.

The end-plates *b b* are constructed with lips or flanges, *c c'*, as shown clearly in fig. 3, the pieces *a a* having their ends fitted between said lips, through which, and *a a*, bolts *d* pass.

This arrangement will admit of the faces or pieces *a a* of the buckets being readily removed from the end-plates *b b*, and in order to admit of an entire bucket being removed without disturbing its axis C, I design to

have the end-plates *b* slotted from their centres outward, and retain said plates properly on their axis by bolting plates I× to the inner surfaces of the end-plates *b b*, (see figs. 8, 9, and 10.)

By removing or detaching the plates I×, the buckets, it will be seen, may be removed from the wheel, without removing their axes C, or disturbing any of the parts of the wheel.

By having the buckets constructed double, or with two faces or pieces *a a*, they are balanced on their axes C, and, as the wheel rotates, readily adjusted or retained in the position previously referred to, (a vertical one,) but little friction being created. The two faces with each bucket are also an advantage, as well as having the feathering-arrangement next to the side of the vessel, and the feathering-rim G within the wheel, the feathering-mechanism by this means being more out of harm's way, and less liable to be injured than if it were placed at the outer side of the wheel.

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

1. The combination of the circular plate F, eccentric E, rim G, eccentric H, eyes I, and double buckets D, all constructed and arranged as described, for the purpose specified.

2. Constructing the buckets with two pieces or faces, *a a*, and fitting the same loosely on fixed axes, C, substantially as and for the purpose herein set forth.

3. The eccentrics H of the double buckets D, connected with the feathering-rim G by means of eyes, I, fitted upon the eccentrics, and bolted to the sides of the rim, the latter being firmly secured to the plate F, as herein described for the purpose specified.

4. Having the end-plates *b b* of the bucket slotted from their centres outward, with plates I× bolted to the inner surfaces of the end-plates, over the slots, substantially as and for the purpose set forth.

ROBERT BELL.

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H. Miller.