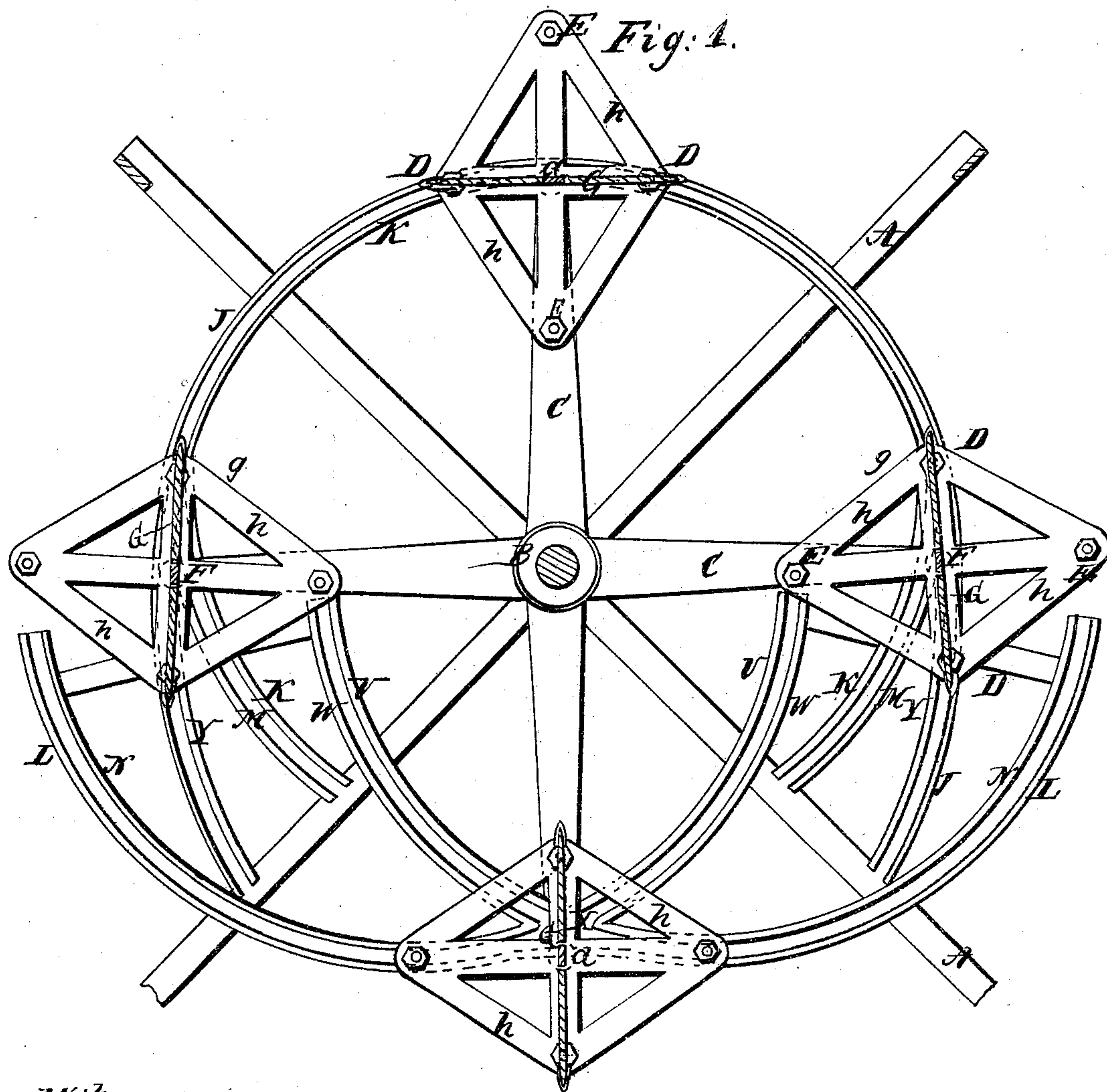


Sheet 1. 2 Sheets

J. Burson.
Paddle Wheel.

Nº 78,574. Patented Jun. 2, 1868.



Witnesses.

Wm. C. Reed
G. W. Reed

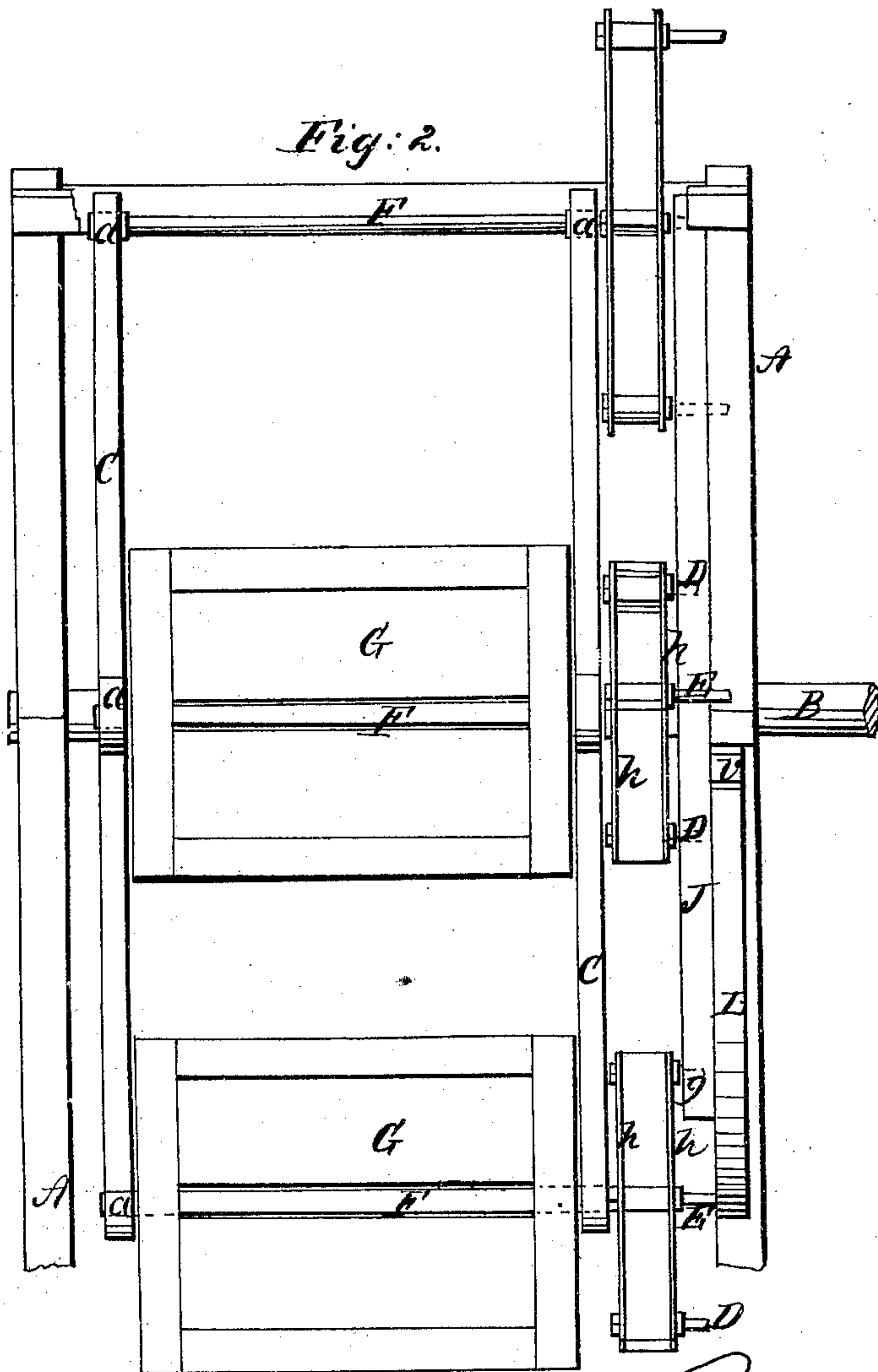
Inventor

J. D. Burson
Per Brown, Combs & Getty

Sheet 2. 2 Sheets.

J. Burson.
Paddle Wheel.

N^o 78,574. Patented Jun. 2, 1868.



Witnesses

W. Comby
G. W. Reed

Inventor

J. Burson
Per Brown Comby & Co

United States Patent Office.

JAMES BURSON, OF YATES, ILLINOIS.

Letters Patent No. 78,574, dated June 2, 1868; antedated May 23, 1868.

IMPROVED PADDLE-WHEEL.

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, JAMES BURSON, of Yates city, in the county of Knox, and State of Illinois, have invented a certain new and useful Improvement on Feathering-Wheels applicable as Paddle-Wheels, and to other purposes, of which the following is a full, clear, and exact description, reference being had to the accompanying drawing, forming part of this specification, and in which—

Figure 1 represents a section of a feathering-wheel, taken transversely through the main or centre shaft, with its guiding-rails or tracks constructed according to my improvement, and

Figure 2 an end view of the same at right angles to fig. 1.

Like letters indicate like parts in both figures.

My invention, which will here be illustrated as applied to paddle-wheels, for which use it may either be worked submerged or as ordinary paddle-wheels are operated, is also applicable to water or tidal-wheels, the same principle of action or construction being observed whether the fluid act upon the wheel or the latter upon the former, it only being necessary, in order to adapt the device to either or any of these uses, to modify or alter certain details, which come within the province of the engineer or those skilled in constructing mechanism of the description referred to.

The nature of my invention consists in a novel mode or arrangement of means for feathering the blades or buckets of the wheel, by, firstly, a novel combination, with the bucket or blade-shafts, of guide-rod holding-plates or carriers, arranged outside the arms of the wheel, for operation in connection with fixed ways, and whereby the support to the buckets may be duplicated at pleasure; and said invention further consists in a combination of four guide-rods to either bucket, with separate tracks, for securing a strong and steady feathering action of the buckets in the rotation of the wheel.

Referring to the accompanying drawing, which may be supposed to represent a vertical paddle-wheel arrangement, A indicates portion of the wheel-house frame, B the main or centre shaft of the wheel, and C the arms of the latter, duplicated on opposite sides of the wheel, and varying in number according to the number of buckets.

G are the buckets, hung by journals, *a*, in the arms C, preferably at the outer ends of the latter, said journals being allowed to turn freely in their bearings, F being the shafts on which the journals are formed. On one, or, it may be, both ends of these bucket-shafts, are secured guide-rod holding-plates, *h*, or carriers. These plates or carriers are for the purpose of supporting guide-rods D and E, which, in connection with appropriate rails or tracks, give the requisite feathering action to the buckets. I prefer to make these plates *h*, which constitute the carriers, vertical and parallel to each other, either pair, and as thin as consistent with strength, in order that they may pass through the water with but little displacement of the latter. Such carriers may be strengthened or braced by thimbles on the guide-rods E, between the plates *h*, and by a strip or plate corresponding to a section or end-extension of the bucket-blade, and lying in line with the guide-rods D. Both sets of guide-rods, D and E, may be secured to the plates or carriers *h*, say, by a collar resting on the outer plate and nut, holding each rod on the inner side of the carriers. The bucket-shafts F are represented as passing centrally through the carriers formed by the plates *h*, and should be squared at their fit therethrough, with shoulders on the inside and nuts on their exterior ends, and be made to support grooved arms, into which sharpened wooden blades or buckets, G, faced or edged by metallic caps, are inserted and secured by rivets. The guide-rods D and E, it will be seen, are placed outside of the arms C, whereby the feathering motion of the buckets, by means of suitable rails or tracks, is secured; also, such mode of hanging the buckets, and providing them, on their respective guide-rod carriers, with outside guide-rods, admits of their strength being increased by a similar arrangement or connection with other arms, C, parallel, at a suitable distance apart, to the first set.

To the side of the vessel or wheel-house there are secured two sets of ways or tracks, formed by rails, which, in connection with the two pairs of guide-rods, D and E, to each bucket, serve to feather or turn the buckets. One of these rails or tracks, L, is arranged to conform to the lower travel of the buckets, under and outside

the exterior guide-rod E, in the rotation of the wheel, its curvatures being determined by revolving the wheel, and at the same time maintaining the bucket or blade in the required position. Another and nearest interior track, U, is situated immediately outside of the inner guide-pin, E, of each bucket, during the lower range or traverse of the wheel, the shape and position of such track being regulated as directed, for laying the exterior track, L. Within these tracks, U and L, are tracks N and W, forming what may be termed two curved wedges, the track N being concentric with L, and the track W with the interior one, U.

For the guidance of the rods D of the buckets, to secure to the latter a feathering action, as well during their upper as lower travel, a track, J, is arranged over or outside of the rods D, and another similarly-disposed interior track, K, fitted for the inside guidance of said rods. These tracks, it is preferred, should extend throughout the whole of the upper range or travel of the rods in the revolution of the wheel, and for almost the upper half of such circular travel, or nearly so, these tracks may be concentric, or thereabouts, with the wheel, say from g to g ; but from these latter points, the outer one, J, of these tracks, in its dip or extension downwards, spreads or inclines outwards, while the inner one, K, of such tracks, from the same points in its downward extension, inclines or is contracted inwards. Within the spaces formed by the downward extension, as specified, of these tracks J and K, are ways or tracks, Y M, the one of which is concentric with the track J, and the other with the track K.

The tracks J K Y M are arranged to lie in a different vertical plane to that of the tracks L N U W, sufficiently far apart as to enable the guide-rods D, that may be comparatively short, to pass over or clear the latter tracks during the rotary movement of the wheel, while the guide-rods E may be longer, to project into their respective ways.

As the wheel rotates, the guide-rods D, passing through the space between the tracks J K, the rear of such guide-rods to each bucket, in their commencement of the lower travel, directs the forward one into between the tracks J Y, and this latter one, in its turn, directs the rear of such rods into between the tracks K M. The movement of the guide-rods D in between these several rails, ways, or tracks, inclines the guide-rods E to enter between their respective tracks, L N U W, the run or shape of which, as of the other set of tracks, J K Y M, causes the bucket, in its lower travel, to assume a vertical position, said buckets, in or when crossing the highest point of travel, having a horizontal position. On or after crossing a lower point or portion, X, the travel of the two guide-rods E to either bucket is reversed, the one rod passing from between the outer tracks, L N, on the one side of a perpendicular line intersecting X, into between the inner tracks, U W, and the other of such rods afterwards leaving the tracks U W, on one side, to enter between the tracks L N on the other or advance side of such perpendicular. The guide-rods D, too, reverse their positions, the one of such rods to either bucket, during one portion of the revolution of the wheel, being in advance and afterwards in the rear, the one entering between the tracks K M on the one side of the wheel's axis, and leaving by the tracks J Y on the other, a reverse position or course taking place for the other of such guide-rods.

By this construction and arrangement of tracks and guide-rods, though more or less foreshortening or change of the tracks or certain of them, or different disposition of the guide-rods, may be made, without altering the invention, a perfect feathering action is secured for the buckets in a simple and comparatively frictionless manner, with a solid or steady hold of them at certain portions of their travel, where resistance or shock is felt, by means of the carriers in gear not only at opposite but at intermediate or cross-points with the several tracks.

One important feature in this invention, and which is or may be irrespective of the number of guide-rods, is the position of the carriers h , outside the arms C of the wheel, that enables the buckets to be strengthened or guided any number of times by a repetition of the carriers, as specified.

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

1. The plates or carriers h , for holding the guide-rods D E in four angular positions, in combination with the ways L N U W and J K Y M, all arranged and operating substantially as shown and described.
2. I claim the combination of four guide-rods to either bucket, with separate rails or tracks to either pair of said rods, for operation together, substantially as and for the purpose or purposes herein set forth.

JAMES BURSON.

Witnesses:

A. LE CLERC,
J. W. COOMBS.