J. BURSON.

Feathering Paddle-Wheels.

No 157,310.

Patented Dec. 1, 1874.

Fig. 2.

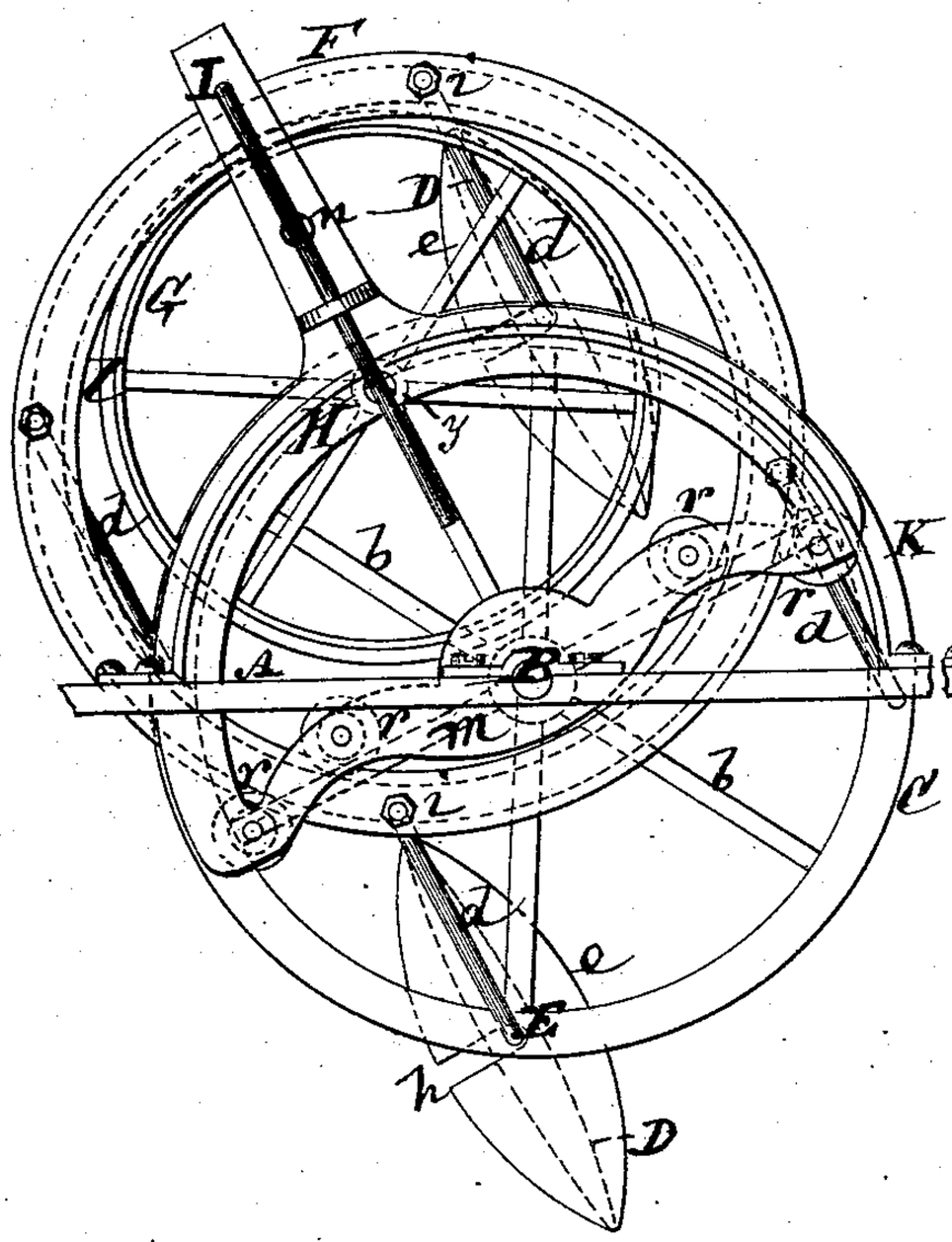


Fig. 1.

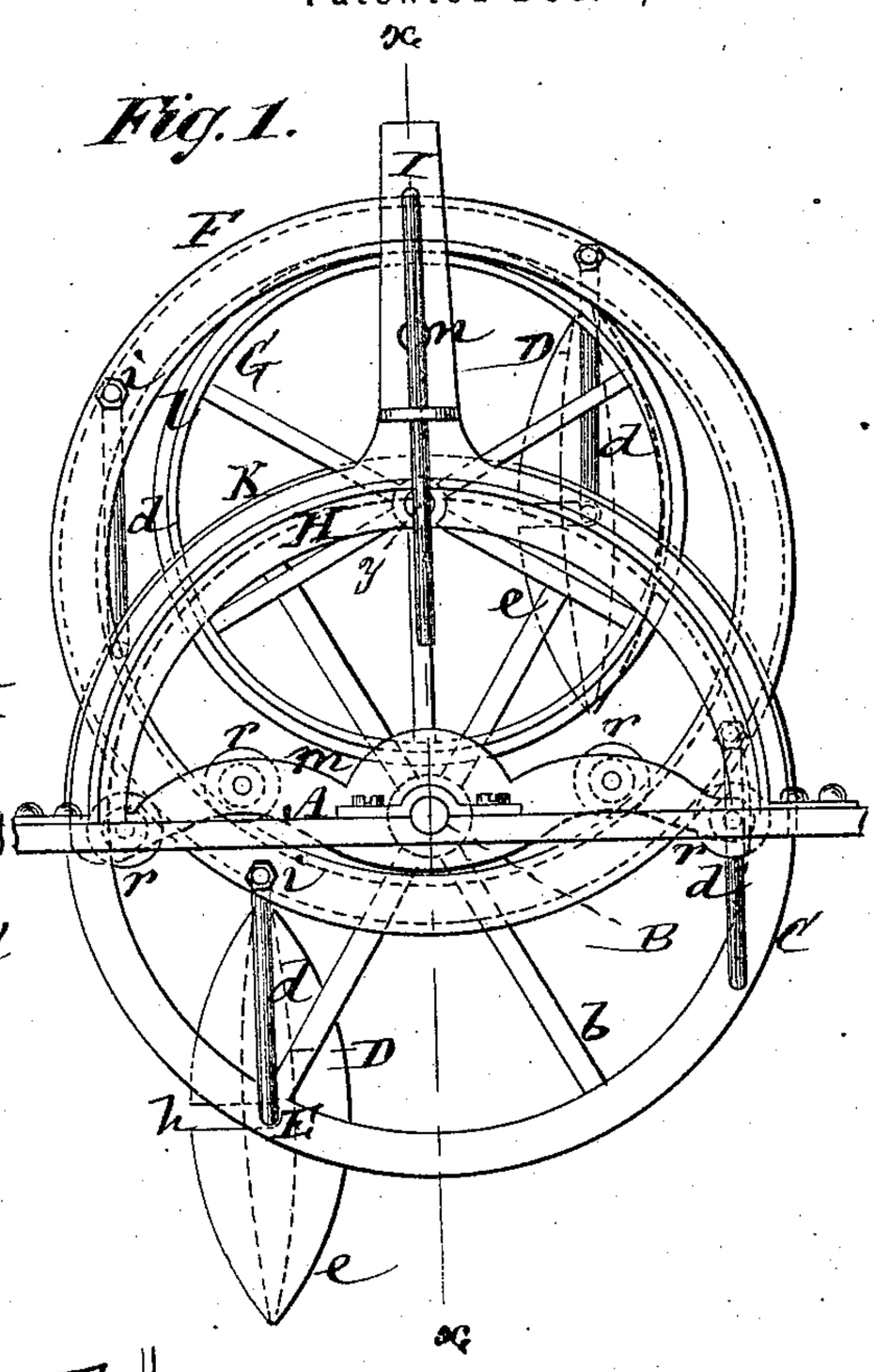
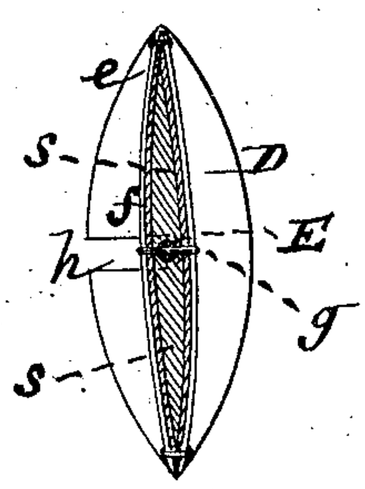


Fig. 3.

Fig. 4.



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UNITED STATES PATENT OFFICE.

JAMES BURSON, OF YATES CITY, ILLINOIS, ASSIGNOR TO THE AMERICAN PADDLE-WHEEL COMPANY, OF NEW YORK CITY.

IMPROVEMENT IN FEATHERING PADDLE-WHEELS.

Specification forming part of Letters Patent No. **157,310**, dated December 1, 1874; application filed April 20, 1874.

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 an Improvement in Paddle-Wheels, of which the following is a specification:

My invention relates to feathering paddle-wheels; and consists in various novel combinations and construction of certain parts, whereby the action of the wheel, as a whole, is improved, with every facility for adjusting the floats to any position varying from a horizontal to a vertical one, and great strength, combined with lightness, is obtained, also an enlarged convenience for detaching the floats when required.

In the accompanying drawing, Figures 1 and 2 represent side views of a paddle-wheel constructed to carry four floats or buckets, two only of which are here shown, but any number of floats may be used. Fig. 1 shows the floats as adjustable to occupy vertical positions, and Fig. 2 as retaining inclined positions during the rotation of the wheels. Fig. 3 represents a vertical section on the line *x x*, and Fig. 4 is a transverse section through one of the floats.

A is a portion of the frame of the wheel-house, and B the main revolving shaft, on which is hung, so as to revolve with it, the main float-carrying wheel C, composed of two parallel rims arranged at a suitable distance apart to receive the floats in between them, and having arms *b*. D D are the floats or buckets, which are hung on shafts E, arranged to pass through their center in directions parallel with the main shaft B. These shafts E have their bearings in the rims of the wheel C, or in internally-projecting side sockets *c* branching therefrom, and are bent or cranked, as at *d*, with the wrist-pins of the cranks arranged to turu in the rim of a wheel, or rather ring, F, lying parallel with the wheel C, but eccentric thereto. The cranks *d* may be made of one and the same piece with their shafts E, but it is preferred to construct them in sliding or adjustable sections radially to their shafts, whereby a more accurate and easy fit of the cranked shafts with the two wheels C and F is obtained, and the support of the wheel or ring F by an inner wheel, G. The floats D are constructed of thin metallic plates bent over their shaft E, and riveted together at their ends, with two wooden wedges, *s*, interposed between the plates, and with their butts next to the shaft slightly thicker than the latter, for the purpose of relieving pressure thereon. I then attach the end plates or flanges *e* of the floats. Thus constructed, the face plates of which each float is composed are braced externally by one or more straps, *f*, riveted to and through the plates, and a key, *g*, is passed through the float and its shaft to secure the whole together. This construction gives a firmness, together with a smoothness of surface and sharpness of edge, to the float. The flanges *e* and the face plate of either float on its one side is cut away at the ends of the floats, forming slots *h*, within which the side sockets or bearings *c* enter, and whereby, on withdrawing either cranked shaft E during the lower range in travel of the float below the frame A, and on taking off nuts *i i* on the end of the shaft E and its crank *d*, the floats may readily be removed without detaching other parts than the keys *g*. When the floats are in their places, and secured to their shafts E, the slots *h* may be closed by means of adjustable plates *k*. When practicable, I cast the rim of the wheel or ring F solid, and groove both the internal and external edges wider than an annular rib or supporting tongue, *l*, on the wheel G, to insure a free movement of the ring F. The wheel G, on which the ring F rests and runs, and which has its center at *y*, is carried by a swinging frame or arch, H, the base *m* of which rocks on a center concentric with the shafts B. This adjustable or swinging frame H is mounted with a lever, I, and attached spring *n* entering within the notches or teeth of a curved rack, K, which is securely bolted to the top of the frame A, and holds the lever I by its spring *n* in place. This rack K and the swinging frame or arch H are arranged parallel with each other, and so as to rest the one against the other, whereby they are mutually supporting. To change the floats from a horizontal to a vertical position the lever I is sprung out of the rack K, and turned from its position represented in

Fig. 1, and the swinging frame or arch H turned till the base *m* of the latter assumes a vertical position or thereabout. This adjustment is for the purpose of avoiding the drag of vertical paddles or floats when a derangement of the engine or a failure in the supply of fuel makes it necessary to resort to sails for the propulsion of the vessel. Under such condition of circumstances it will be desirable to fasten the wheel or ring F to the frame A.

In Fig. 2 of the drawing, the swinging frame or arch H is represented as occupying an intermediate adjustment, which may be increased or diminished to give the floats any desired angular set between their extreme vertical and horizontal positions.

For the better support of the wheel or ring F, the base *m* of the swinging frame or arch H is provided with four small wheels or rollers, *r*, having tongues or ribs on their periphery arranged to enter or run within the internally and externally grooved ring F. Two of these rollers are arranged to run in the external groove of the ring F, and the other two in the internal groove thereof, and opposite the external rollers. Said rollers, thus arranged, sustain the ring F when the floats enter and leave the water, and are most exposed to strain when the floats strike ice or a drift. The ends of the floats may be of convex shape, to give a glancing stroke of the floats on ice or drifting logs. When the paddle-wheel is in close proximity to the side of the boat, the floats should be wider or increased in dip and slope, or diminish outward, to drive obstructions away from the boat. The height or disposition of the main shaft B limits the dip of the floats, also, the length of the float-cranks *d*, and the diameter of the wheel G. The feathering ring F, resting mainly on the wheel G of large diameter, has little friction and admits of great velocity, with a proportionate increase of the propelling power, by the machinery employed. The ring F and wheel C are of about the same diameter, so that the wrists of the cranks *d* are at the same distance from the center of the ring F that the shafts E are from the center of the wheel C. Thus, when rotating the paddle-wheel, the ring F and the wheel C move in equal orbits, and carry the load, as it were, with equal speed, and when the parts are in the position represented in Fig. 1 the cranks *d* and floats D occupy a vertical position during the rotation of the paddle-wheel.

I claim—

1. The combination of the swinging arch H, carrying the wheel G, with the feathering-ring F mounted on the periphery of the wheel G, and connected with the paddle-floats by the cranks E, and the rollers *r r* journaled in the arch H on opposite sides of the ring F, for supporting it on its internal and external peripheries, substantially as described, for the object specified.

2. The swinging arch H, provided with the lever I, and attached spring *n*, in combination with the semicircular rack K, the wheel G journaled to the swinging arch, and feathering-ring F, mounted on the periphery of the wheel G, and connected to the floats by the crank-shafts E, substantially as described, for the purpose specified.

JAMES BURSON.

Witnesses:
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