C. Fletcher.

Paddle Wheel.

No. 14,497. Patented Mar. 25, 1856.

Fig: 2.

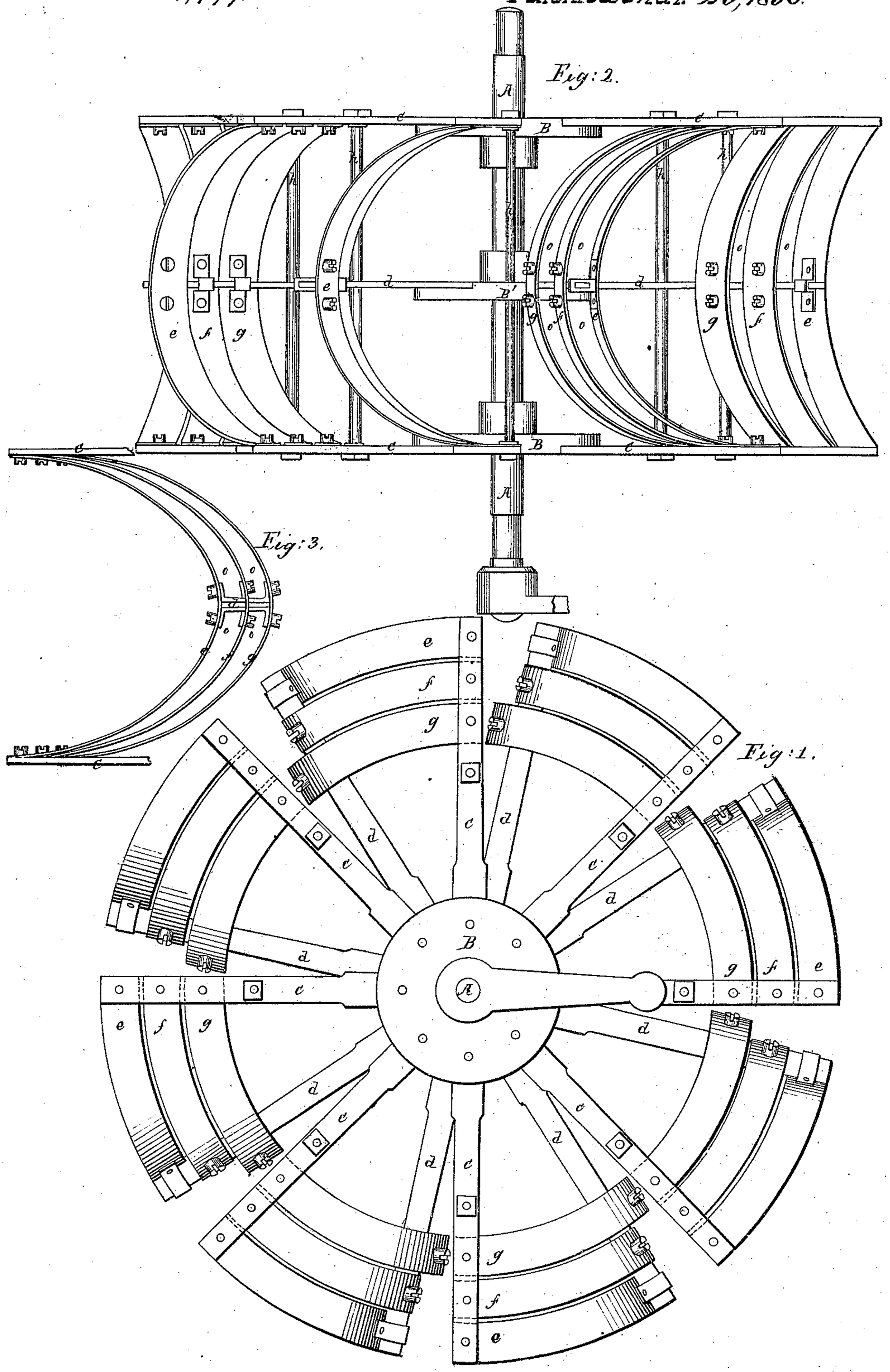

Fig: 3.

Fig: 1.

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

CALVIN FLETCHER, OF CINCINNATI, OHIO.

PADDLE-WHEEL.

Specification of Letters Patent No. 14,497, dated March 25, 1856.

To all whom it may concern:

Be it known that I, CALVIN FLETCHER, of Cincinnati, in the county of Hamilton and State of Ohio, have invented a certain new and useful Improvement in Curvilinear Propellers; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the annexed drawings, forming part of this specification, in which—

Figure 1, is a side elevation of my propeller, showing the several parts properly attached. Fig. 2, is an edge view of one half of the propeller. Fig. 3, is a direct edge view of one of the compound buckets, as attached to the arms of the propeller, and showing their curves and the openings made between them by their required relative positions.

The nature of my invention consists in placing on each radius, or arm, of the paddle wheel, a series of parabolic buckets, or paddles, so arranged and constructed as to possess all the advantages of a wide or deep curved bucket, in taking a good hold of the water for the purpose of propulsion, and at the same time the advantages of a narrow paddle in presenting very little resistance to the water when the buckets are rising out of, or first entering the water and obviating the lifting effect of broad paddles which causes so serious a loss of power.

In order to enable others skilled in the art to make and use my improved propeller, I will proceed to describe its construction and operation.

In the drawings Fig. 1, A represents the shaft of the wheel set in its bearings.

B, B, (Figs. 1 and 2) are the center pieces or flanges which support the outside series of arms *c*, *c*, &c., and B′ is the middle flange which carries the inside series of arms *d*, *d*, &c.

Thus far the construction of my propeller is or may be similar to the ordinary paddle wheels, excepting that the inside arms *d*, *d*, &c., are not set in a line with their corresponding outside arms *c*, *c*, &c. This necessarily arises from the fact that the buckets are curved and that to the outside arms are attached the ends of the curved buckets, while the center of the buckets is attached to the inside arms.

e, *f*, *g*, are the buckets which are made of sheet iron or other suitable material of the requisite strength. Of these buckets three or more are placed in each arm of the wheel, according to the effective depth of paddle required. These three buckets form one series and as each series is alike the particular description of one series will suffice.

The number of series of paddles to be used in any wheel will depend on the width of the wheel, because the curve which I give to the buckets is parabolic. Each bucket of a series is about eight inches in width, or depth. The extremities of each bucket are bolted to the outside arms *c*, and lie on the outside arms side by side and a slight distance only apart as seen in Fig. 1. These buckets are bent into a parabolic curve, the length of the axis being equal to its base. The base will of course be the width of the wheel. It is preferred that the axis of the curve should not exceed six feet. These three or more buckets *e*, *f*, *g*, are bolted side by side to the outside arms *c*, *c*, of the wheel, and pass around the inside or middle arm *d*. The center of the outside bucket *e* (being that one which is farthest from the center of the wheel) is fastened, by means of screw bolts and iron straps or stirrups, to the inner side of the middle arm *d*, (see Fig. 1). The center of the next bucket *f* is bolted in a similar manner to the outside of the middle arm, so as to project as far beyond the bucket *e* (at the apex of the curve) as the width of the bucket (say about 8 inches). The third bucket *g*, at its center projects the same distance farther beyond the bucket *f*, (see Fig. 1, and Fig. 3.) This arrangement leaves a space at the vertex of the curve of the buckets, between each bucket and that next in the series, equal to the width of the bucket, this space gradually lessening as the buckets approach the outside arms, as clearly seen by looking at the edge of the wheel, as shown at *o*, *o*, &c. in Fig. 3. Through these spaces the water can freely pass, presenting little or no vertical resistance to the buckets in their egress from the water. Transverse iron rods *h*, *h*, serve to unite the outside arms and prevent their springing apart when the wheel is in motion.

The great advantage of the use of the parabolic curve for the shape of the buckets is, that as the buckets enter the water at right angles to its surface, or nearly so, the shock or jar, which is always consequent on the use of a flat straight paddle, is entirely obviated, and the more they sink into

water the firmer hold they obtain; and by drawing and retaining the water in their sweep, they greatly increase their effective propelling power. If however single buckets of this shape were made broad enough to be of any practical use, they would be liable to the serious defect of presenting a broad surface to the resistance of the water when the paddle is about to emerge, which would be rather increased than diminished by the curvilinear shape. My plan of making a compound bucket, however, not only entirely obviates this difficulty, but renders the passage out of the water of the paddles almost without any loss of power. The space between the buckets, edgewise, being as great as at the vertex of the curve, where the pressure is greatest, as the width of the buckets, the water readily escapes through these openings and allows of the easy passage of the paddles in their upward motion. The combination and construction of the compound buckets in my propeller is so advantageous, that the motion of the paddle greatly increases its hold on the water by causing a strong, lateral flow thereof into the buckets, whereby it is caused to rise considerably above the surrounding water level, and whatever may be its size, or however frequent its revolutions, the buckets will pass steadily and smoothly through the water with the minimum vertical resistance, and maximum horizontal, or propelling, force—and, by reason of its divided propelling surfaces, it is peculiarly suited for ocean steamers, as being adapted to the action of the ocean waves. The advantages of my propeller may be briefly stated to be, 1st, that it takes the greatest propelling hold of the water; 2d, that it enters the water so gently as to avoid any jar to the vessel or engines; 3d, that it is entirely free from lifting the water in any part of its revolution.

Having thus described the construction and operation of my improved propeller, I do not claim the curvilinear shape of the buckets as in itself new or patentable, but

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

The construction of propellers with a series of narrow buckets, of curvilinear or parabolic shape, combined and arranged in the manner hereinbefore set forth, or its equivalent, for the purpose of combining the greatest propelling force, with the least possible resistance to the ingress and egress of the buckets in their passage through the water.

CALVIN FLETCHER.

Witnesses:
J. N. WALKER,
J. W. BOARDMAN.