November 1, 1913.

DRAWING

2,076

A careful search has been made this day for the original drawing or a photolithographic copy of the same, for the purpose of reproducing the said drawing to form a part of this book, but at this time nothing can be found from which a reproduction can be made.

Finis D. Morris,

Chief of Division E.

AWK

UNITED STATES PATENT OFFICE.

P. G. GARDINER, OF NEW YORK, N. Y.

MANNER OF ARRANGING THE PADDLES OF PADDLE-WHEELS FOR PROPELLING VESSELS.

Specification of Letters Patent No. 2,076, dated May 4, 1841.

To all whom it may concern:

Be it known that I, P. G. GARDINER, of the city of New York, in the State of New York, have invented an improvement in the manner of constructing the paddle-wheel for propelling vessels by steam or other power, which improved wheel I denominate the "circular convolution paddle-wheel"; and I do hereby declare that the following is a full and exact description thereof.

On each of my paddle wheels I use a double row, or series, or a greater number, of buckets, which buckets are placed so as to form an angle with the axis of the wheel; and I deem it best to place them so as to stand at an angle of forty five degrees, or nearly so, with said axis, or shaft but a variation of four or five degrees from the angle may be made without materially interfering with the action of the wheel. In constructing my wheel with a double row, or series of buckets, there must be three sets, or series, of arms the middle being twice as numerous as the two outer series, the buckets of each outer series meeting in the middle.

In the accompanying drawing Figure 1, is a perspective view of a part of my paddle wheel, and Fig. 2, an edge view of some of the buckets, showing the manner in which they stand in their relationship to each other.

A is the shaft; *a*, *a*, *a*, the outer series of arms; *b*, *b*, *b*, the middle, and *c*, *c*, *c*, the inner series.

B, B, B, are the buckets which overlap each other at their inner ends, to a distance equal to the thickness of the arms to which they are attached, and allow a space between each other equal to the distance apart of the middle series of arms. As these arms are all placed in the direction of radii from the center of the wheel, each of the buckets will be convoluted, or twisted, in consequence of its opposite ends being attached to the radiating arms so as to cause each bucket to form an angle of 45 degrees, more or less, with the axis and this convolution, or twist, constitutes an essential character of my wheel.

In the direction of the buckets on the wheels, on each side of the vessel to be propelled, is to be such as to throw the water outward, from the vessel, by the angle of the buckets. When my wheel is used for canal boats, and probably also for other purposes, it may be deemed best to employ but one and that placed in the middle of a twin or other suitably formed boat, and in this case I still construct my wheel with the double series of buckets, but I place the two series at reverse angles, while in all other respects I retain all the characteristic features of my wheel, as above described.

Having thus fully described the nature of my invention, and shown how the same is to be carried into operation, I do hereby declare that I do not claim the mere placing of the buckets in such manner as to form an angle with the axis, or shaft of the wheel, this having been done, but with other views, and under arrangements differing from those adopted by me; but

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

The placing of a double series of buckets so as to form an angle of forty five degrees more or less, with the axis of the wheel, said buckets having each of their inner ends attached to a distinct arm thus allowing a free or open space between each bucket, in each series of buckets, as set forth; said buckets being convoluted in consequence of their being attached to radiating arms in the manner herein fully made known.

P. G. GARDINER.

Witnesses:

I. LABAGH,

JAMES B. KELLOGG.