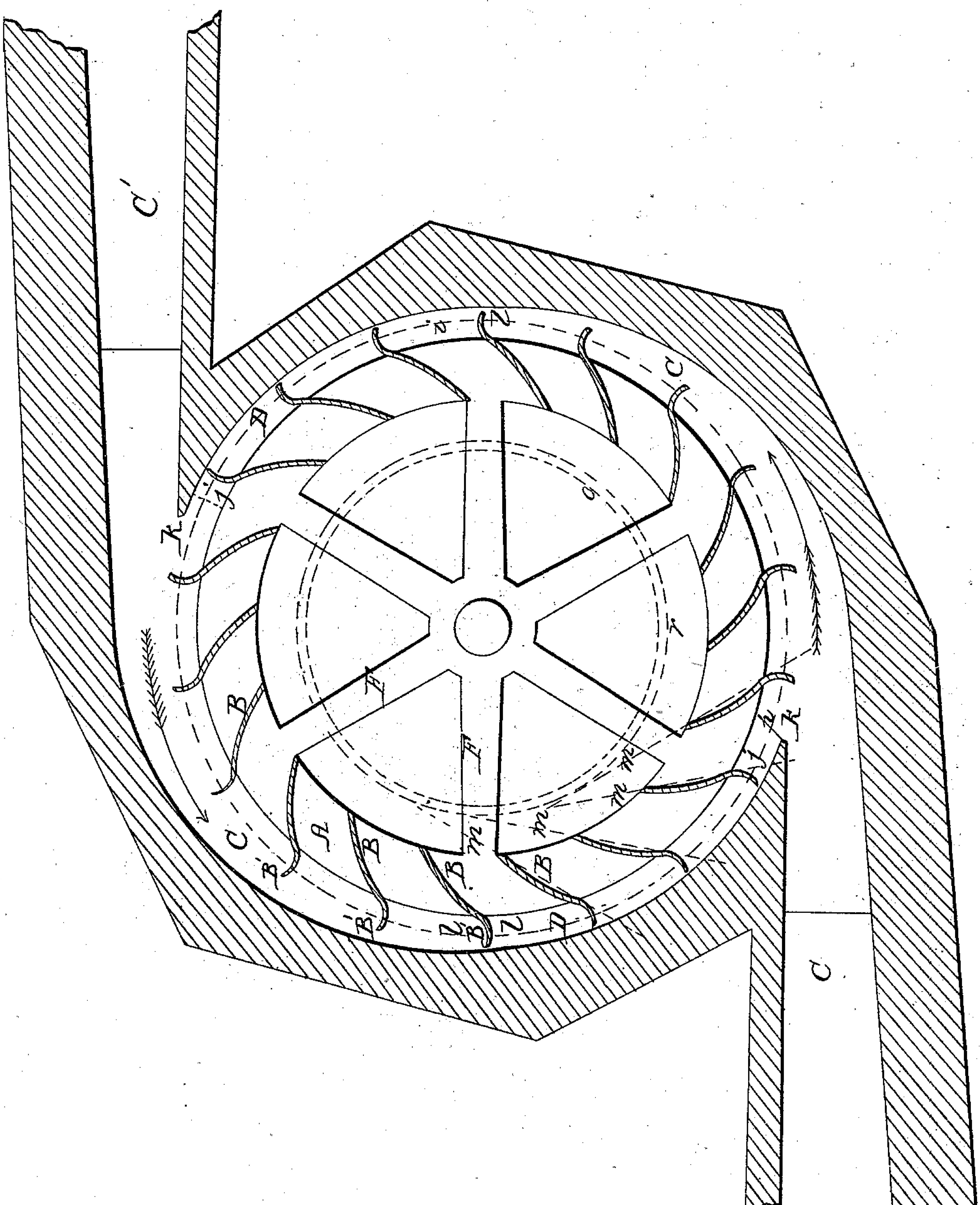
J. Gardner,

Water Wheel,

No. 3,886, Patented Jan. 16, 1845



UNITED STATES PATENT OFFICE.

JAMES GARDNER, OF SOUTH LEE, MASSACHUSETTS.

IMPROVEMENT IN WATER-WHEELS.

Specification forming part of Letters Patent No. **3,886,** dated January 16, 1845; antedated July 16, 1844.

To all whom it may concern:

Be it known that I, JAMES GARDNER, of South Lee, in the county of Berkshire and State of Massachusetts, have invented a new and useful Improvement in the Construction of Water-Wheels, which is described as follows, reference being had to the annexed drawing of the same, making part of this specification.

The figure is a plan or top view.

The rims A of the wheel, between which the buckets B B′ are placed, the shaft and arms, and other parts of the wheel, except the buckets, are made in the usual manner.

My improvement consists in the construction and arrangement of the buckets B B′, which are shaped like a Grecian cyma or modern scroll and arranged on tangential lines *m* of an inner concentric circle *r*, likewise in the construction of the scroll at the part where the water becomes condensed, being left open in the bottom to facilitate the discharge of the water, and consequently give the wheel a more free action.

The form of the buckets B B′ is thus determined. That portion of the bucket B which lies between the outer edge or periphery of the rim of the wheel and the inner edge is curved to the arc of a circle whose diameter is one-half of the diameter of the wheel, and that portion of the bucket B′ that projects beyond the rim or outer circumference thereof is the arc of a circle one-twelfth the diameter of the wheel, and reversed.

In laying off the lines for the buckets, divide the inner circle of the rim A into equal spaces. Then divide the outer circle into the same number of spaces. Then describe two concentric circles *o p*, one within the rim and the other outside, and divide them into as many spaces as there are to be buckets. With the dividers take one-fourth the diameter of the wheel and place one leg on the inner circle *o* and describe arcs or segments of a circle between the aforesaid points on the outer and inner peripheries of the rim A. These arcs form the inner portions of the buckets B. Then close or contract the dividers to one twenty-fourth part the diameter of the wheel, and describe the outer portions B′ of the buckets in a reverse position from points on the outer circle *p*, outside the rim of the wheel. The buckets thus formed will be on the tangential lines *m* of the circle *r*, previously divided into as many equal spaces as there are buckets in the wheel. Let the outer extremities of the buckets be so shaped as to be at right angles, or nearly so, with the direction of the water where it strikes the buckets. A section of the bottom of the scroll C from *i* to *j* must be omitted, so as to allow the water (which becomes condensed or impinged at the point and retards the movement of the wheel) to descend and escape freely and instantaneously from the buckets, and thereby allow them liberty to perform their rotary movements unimpeded by said condensed or back water. The water acts on the buckets by impulsion from the point *k* to the point *l*, having also a discharge between the buckets toward the center of the wheel.

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

The manner in which I construct my water-wheel—that is to say, the form of the buckets having two distinct curves, one of the curves projecting beyond the periphery of the wheel into spiral chutes, the curves on the face and back of the buckets corresponding, and in combination therewith the openings in the bottom of the spiral chutes for the discharge of the water.

JAMES GARDNER.

Witnesses:

WM. P. ELLIOT,

W. H. WARD.