

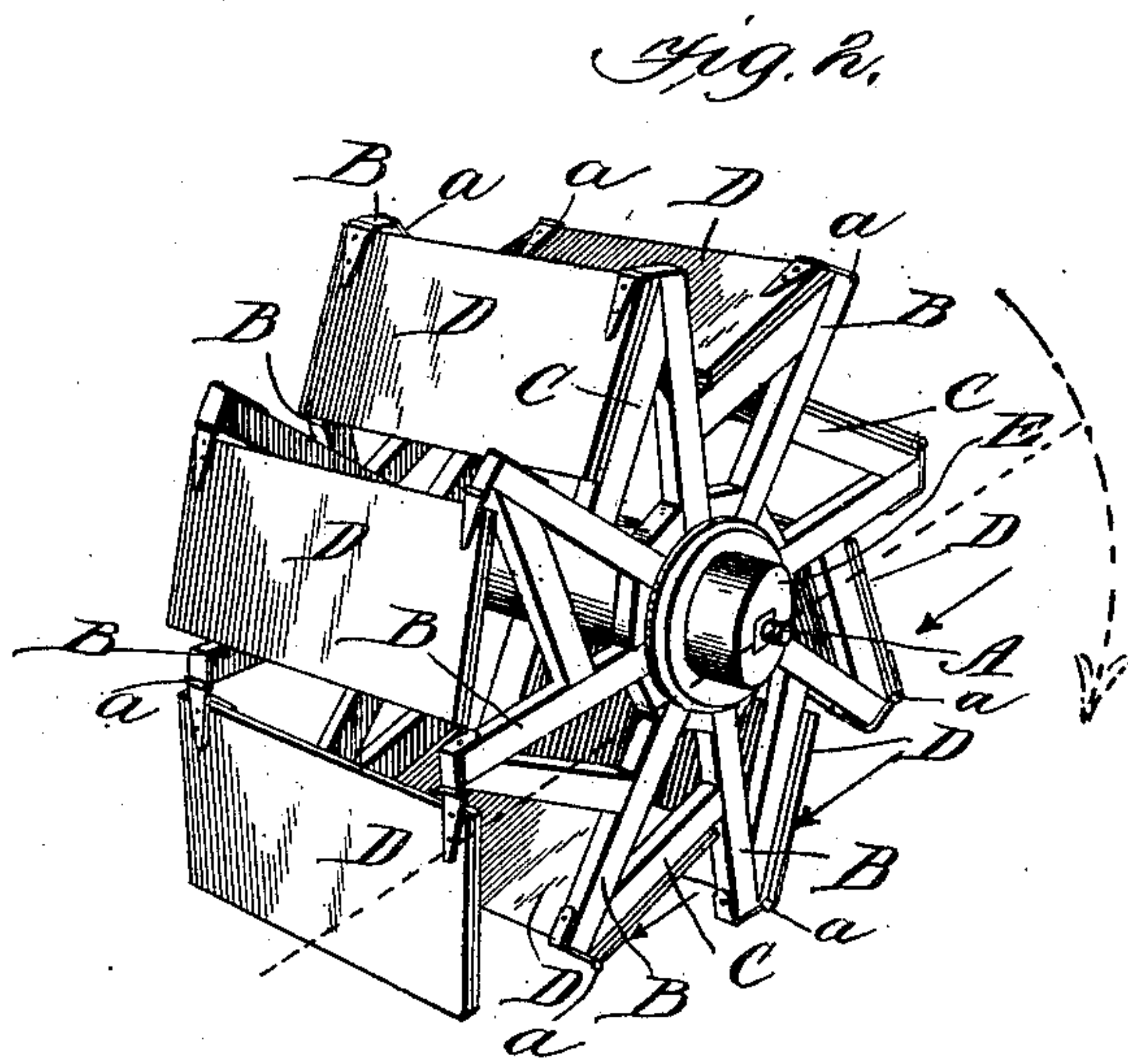
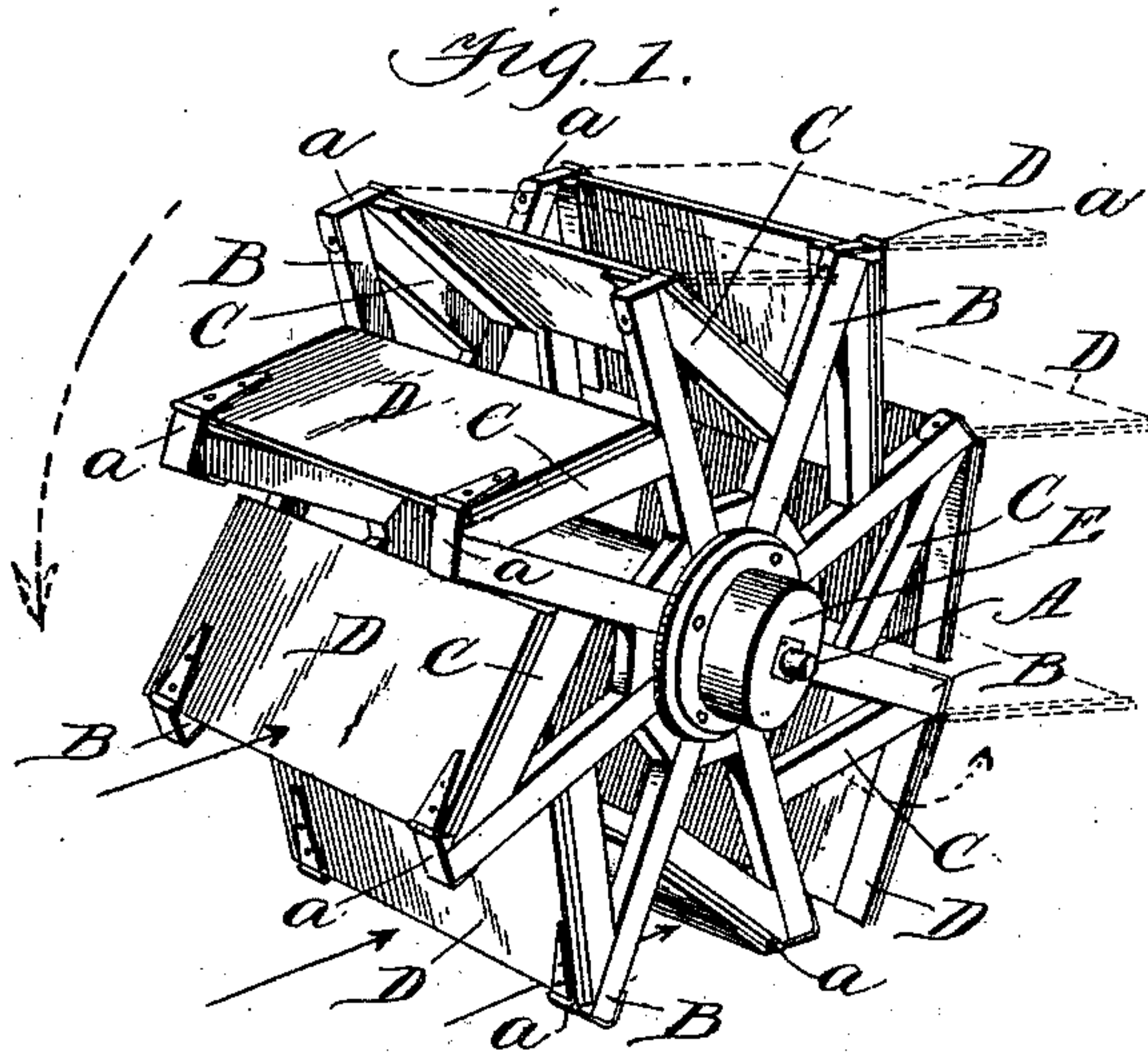
No. 704,405.

Patented July 8, 1902.

S. M. THURMAN.
WATER WHEEL.

(Application filed Nov. 2, 1901.)

(No Model.)



WITNESSES:

Fred. D. B. [unclear]
Edw. W. [unclear]

INVENTOR

Sanford M. Thurman.

BY *Munn & Co.*

ATTORNEYS

UNITED STATES PATENT OFFICE.

SANFORD M. THURMAN, OF YUMA, ARIZONA TERRITORY.

WATER-WHEEL.

SPECIFICATION forming part of Letters Patent No. 704,405, dated July 8, 1902.

Application filed November 2, 1901. Serial No. 80,937. (No model.)

To all whom it may concern:

Be it known that I, SANFORD M. THURMAN, a citizen of the United States, and a resident of Yuma, in the county of Yuma and Territory of Arizona, have made certain new and useful Improvements in Water-Wheels, of which the following is a specification.

My invention relates to water-wheels of that type in which the water flows against and underneath the same and the power of the wheel in rotating is carried by suitable mechanism to any desired point of utilization.

My invention has for its object to provide a simple wheel of relatively small diameter which may be either partly or wholly submerged and which when located in running water containing driftwood will readily ride over the same without being damaged thereby or stopping its action.

It consists in the peculiar construction and arrangement of parts, which I will now proceed to describe with reference to the drawings, in which—

Figure 1 is a perspective view of the front side of the wheel, and Fig. 2 a similar view of the back side.

In the drawings, A represents the wheel-shaft, to which is firmly secured two sets of radial arms B. At each end of the wheel there are a series of inclined bars C, which are located between the radial arms B, and at one end are firmly secured to the outer extremity of one radial arm and at the other end are firmly connected to the next adjacent radial arm at a point near its middle or at a point a little closer to the center of the wheel than the middle of the radial arm. These inclined bars form braces between the radial arms to stiffen the same and also form seats or rests for the paddles which prevent the paddles from ever shutting up to parallelism with the radial arms.

D represents the paddles. These are hinged at one edge *a* to the outer ends of the radial arms B, so as to swing freely, and are of a width about equal to the length of the brace-arms C, against which the paddles rest when receiving the pressure of the water. This water-pressure is always on the external face of the paddles and is distributed by the inclined braces all around the wheel without the necessity for any circumferential rim. The

inclined rests, it will be seen, are located between the paddles and the center of the wheel.

The wheel is to be mounted in bearings, which carry the shaft A, and may be either partly or wholly submerged in the water. The direction of the flow of the water is indicated by the full-line arrows, and when the water strikes the front and lower part of the wheel it finds the paddles D resting on the inclined braces and turns the wheel in the direction of the dotted arrow. Just as the paddles reach the point where they begin to rise from the water said paddles leave their seats or braces C, turn on their hinges, and rise out of the water in a suspended position, which causes them to be easily lifted edgewise out of the water without carrying any dead-water. The paddles remain in this suspended position until in turning forwardly over the wheel they gradually lie against the inclined braces and reach the forward side of the wheel.

The whole wheel may be made of wood, in which case it will float partly submerged in a running stream when held in suitable arms carrying bearings for the wheel, or the wheel can be made either wholly or partly of metal, so that it will sink to a submergence entirely beneath the surface. This wheel will still operate effectively when thus wholly submerged, for the pressure of the water flowing downstream will hold the front lower paddles firmly against the inclined seats while the upper and rear paddles will trail out in a horizontal plane through the water, as indicated in dotted lines in Fig. 1. As, however, the areas of pressure on the front side of the wheel are greater below the axle than they are above it, the wheel will work with considerable power even when fully submerged.

To take off the power from the wheel, a pulley E, fixed to the axle A or hub of the wheel, is designed to receive a belt or a sprocket wheel and chain, or any other well-known or convenient mechanism may be employed.

The advantages of this wheel are that it possesses great power for a small diameter, and the paddles descend into the water in such relation and are so braced by their end-rests C as to readily ride over driftwood without being damaged thereby. The paddles also enter the water edgewise in front with

but little resistance and leave the water edgewise in the rear, so that they carry no dead-water in rising.

It will be understood that my wheel works
5 to great advantage with a drop fall of water—
i. e., when the water will fall vertically on
the front side of the wheel and then passes
under it.

By making the wheel very light it may be
10 used as a wind-wheel.

Having thus described my invention, what
I claim as new, and desire to secure by Letters
Patent, is—

A water-wheel having at each end a series
15 of radial arms, inclined braces extending from

the outer end of one radial arm to the middle
portion of the next radial arm, paddles hinged
along their outer edges to the point where
the outer ends of the radial arms and the
outer ends of the inclined braces converge 20
and unite to form the outer angles of the
wheel, the said inclined braces also forming
rests or supports for the paddles when receiv-
ing the water-pressure substantially as de-
scribed.

SANFORD M. THURMAN.

Witnesses:

WILLIAM E. MARVIN,
JESSE E. CROUCH.