To all whom it may concern:

Be it known that I, Ernst Ortwein, a subject of the Emperor of Germany, residing at No. 2 Oberes-Rheinufer, Ludwigshafen-on-the-Rhine, Germany, have invented a certain new and useful Improved Horizontal Water-Wheel; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention has for its subject-matter a water-wheel rotating with a vertical spindle and provided with hinged blades which automatically lift out of the water when returning against the stream.

In the accompanying drawings, Figure 1 is a vertical elevation. Fig. 2 is a longitudinal section.

Mounted in the foundation \( f \) is a foot-step carrying the main spindle \( a \). Fitting on the lower part of the main spindle is a sleeve \( b \).

Immediately on the foundation-plate \( d \) is a divided disk \( c \), which takes into an annular slot in a tooth-wheel \( g \), so as to permit a rotation of the latter while preventing its rising.

Secured to the enlarged and strengthened head of the sleeve \( b \) is a carrier-plate \( h \), which is divided, so as to enable it to take into an annular slot in the nave \( i \) of the water-wheel, so as to allow it to freely rotate, while at the same time preventing it lifting from the carrier-plate. Ball-bearings are provided to diminish friction. On the carrier-plate is a cam ring or path \( t \), somewhat longer than a semicircle and having inclines at each end. On the nave \( i \) is secured a bearing-plate \( l \), to which the blades or paddles \( k \) are hinged. Each blade is provided with a supporting and running bowl \( m \), mounted in ball-bearings. As the wheel revolves these bowls run up the inclines of the cam-ring, along the raised path, and down the end inclines, thus tilting up the blades as they return against the stream. The bearing-plate \( l \) and the nave \( i \) engage, by means of a feather or key, in a longitudinal slot in the spindle \( a \), so that the rotation of the blades \( k \) imparts rotary motion to the spindle \( a \), which may be applied to any useful purpose. The upper end of the spindle \( a \) is carried in a bearing in girders \( o \), secured to pillars \( n \). In order to adjust the height of the blades to varying water-levels, the tooth-wheel \( g \) is preferably constructed as a worm-wheel to be rotated by the worm \( p \). The wheel \( g \) is internally screwed and engages with a screw-thread on the outside of the sleeve \( b \) for the purpose of elevating or depressing the whole wheel.

The lower part of the sleeve \( b \) has a longitudinal slot, into which takes a feather or key \( r \), screwed to the foundation-plate \( d \), so as to prevent the rotation of the sleeve \( b \). The shaft \( a \) of the worm may be prolonged and carried to any convenient position, whence it may be operated. In some cases it may be connected, by means of a clutch or the like, with mechanism deriving its rotation from the main spindle \( a \), so that the power of the latter might be used when required to elevate or depress the wheel.

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

The combination with a vertical spindle \( a \) of the sleeve \( b \), the worm-wheel \( g \), the worm \( p \), the carrier-plate \( h \), the cam-path \( t \), the nave \( i \), plate \( l \) secured thereto and the blades \( k \) hinged to the plate and having carrier-bowls \( m \) bearing on the carrier-plate \( h \) and the cam-path \( t \) substantially as and for the purpose set forth.

In witness whereof I have hereunto set my hand in the presence of two witnesses.

ERNST ORTWEIN.

Witnesses:
Ferdinand Schmitt,
Jacob Adrian.