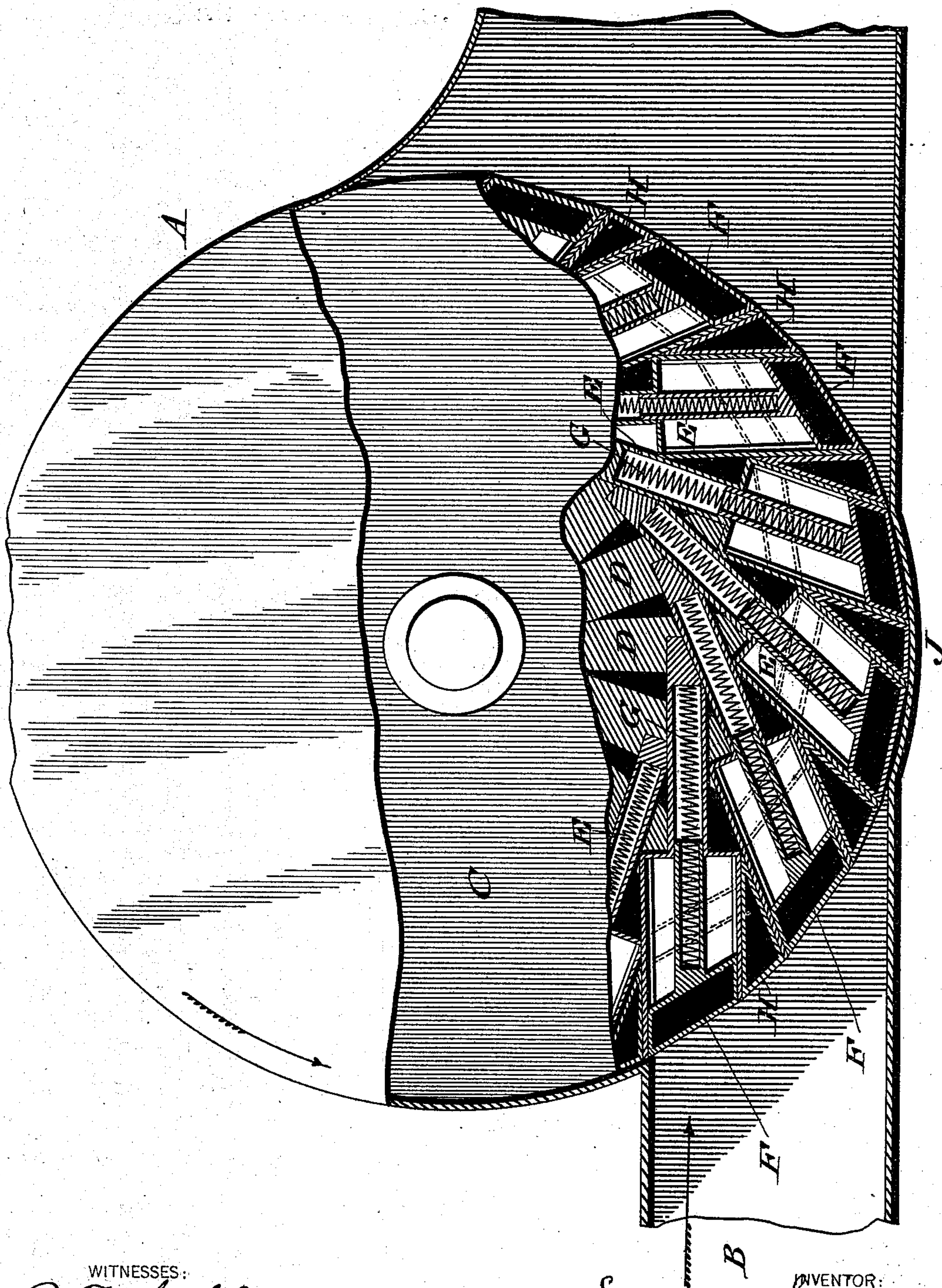


(No Model.)

E. STERN.
WATER WHEEL.

No. 413,976.

Patented Oct. 29, 1889.



WITNESSES:

P. T. Hagler.
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EDWARD STERN, OF PHILADELPHIA, PENNSYLVANIA.

WATER-WHEEL.

SPECIFICATION forming part of Letters Patent No. 413,976, dated October 29, 1889.

Application filed March 1, 1889. Serial No. 301,646. (No model.)

To all whom it may concern:

Be it known that I, EDWARD STERN, a citizen of the United States, residing in the city and county of Philadelphia, State of Pennsylvania, have invented a new and useful Improvement in Water-Wheels, which improvement is fully set forth in the following specification and accompanying drawing.

My invention consists of a water-wheel adapted to have the energy of water transmitted to the same by means of an elastic medium—such as springs, air, &c.—stored in the wheel.

It also consists in adapting the wheel to receive further energy of rotation, owing to the reaction of said medium.

The figure is a partial side elevation and partial vertical section of a water-wheel embodying my invention, the dotted lines in the figure showing the position of the piston-heads when forced back by the current of water.

Referring to the drawing, A designates a wheel-case, and B the flume or chute at the bottom of the same.

C designates the water-wheel, the same having arms or vanes D, which radiate from the hub of the wheel, and are secured to the wheel in any suitable manner.

Connected with the arms and side casings of the wheel, near the outer ends thereof, are tubes or casings E, within which are plungers or pistons F and coiled springs G, the former being at the outer ends of the casing, the latter between said plungers and the arms D.

Interposed between the outer ends of the casings E, or located at the periphery of the wheel and secured to the heads thereof, are chambers or pockets H, it being noticed that said pockets and the casings E are open at the periphery of the wheel, so that water from the flume may enter the same, and also that the casings E are projected in a line at or about a right angle to the radiating arms D. The springs used to convey the power or pressure from the pistons or plungers to the radiating arms of the wheel can be passed through interposing arms until they reach an arm which they strike at or about right angles, substantially as shown. The flume is depressed at a point directly below the wheel, as at J, concentric with the periphery of the

wheel and closely fitting the same, thus providing an abutment for the wheel, forming a cut-off.

The operation is as follows: Water flows through the flume and reaches the wheel and impacts or presses against each piston or plunger as it enters the high-pressure area of flume, as distinguished from the low-pressure area or discharge-area of the flume, whereby said pistons, being only supported by the springs from the radiating arms D, are forced inward, the water filling the space in the cylinder or casings as the pistons are forced inward, the tension or pressure of said spring thus being exerted against the relative arm D, so that, as a portion of the energy of the water is transferred to the arms D, the wheel receives power and consequently rotation. Owing to the pressure of the water which now fills the cylinder in front of the piston or plunger F, said plunger is held in position until opportunity is afforded the energy or power stored up in the elastic medium to force the piston or plunger F to the periphery of the wheel. This opportunity is afforded or offered when, by the rotation of the wheel, the cylinders, after passing the cut-off J, enter the area of discharge. The reactive force of the energy stored in the elastic medium also contributes to the rotation of the wheel when it forces the water from the cylinders after the same have by rotation passed into the low-pressure or discharge area of the flume, it being seen that the wheel has been subjected to the energy or action of the water at or about the place where it dips into the flume and the subsequent reaction of the springs.

It is evident that in lieu of coiled springs shown and described, rubber or other elastic material may be employed; or, if desired, air or other elastic mediums or fluids could be made use of by means of appropriate mechanism, in which case the air or other fluid would be compressed by the plungers when the same are forced inward, and also react and press the plungers outward when the force or pressure upon the surface of the plunger is relieved, or partially relieved, through the plunger passing into the area of low pressure of the flume. It is also evident that I may use steam or other fluids capable of pro-

ducing pressure, in lieu of water, as the prime motor of the wheel.

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

1. A water-wheel with radiating arms, tubes connecting with said arms and having peripheral openings, an elastic medium in said tubes, and plungers working in the tubes and adapted to compress said medium, said parts being combined substantially as described.

2. A water-wheel with arms having tubes with openings at the periphery of the wheel, an elastic medium in said tubes, plungers working in said tubes and adapted to compress said elastic medium, and peripheral pockets in said wheels between the openings of said tubes, said parts being combined substantially as described.

3. A water-wheel with radiating arms and having an elastic medium stored therein and disposed at a line at or about a right angle to

said radiating arms on the wheel, and plungers fitted in the wheel, adapted to receive the impact or pressure of water and thereby compress said medium, substantially as described.

4. A water-wheel having radiating arms and casings disposed at or about a right angle thereto, an elastic medium in contact with said arms, and plungers bearing against said medium, the plungers and medium being located in said casings, substantially as described.

5. A water-wheel provided with casings, an elastic medium in said wheel, and plungers in said wheel adapted to compress said medium, in combination with a flume having an abutment for the periphery of the wheel, substantially as described.

EDWARD STERN.

Witnesses:

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