

(No Model.)

E. COURTRIGHT.
WATER MOTOR.

No. 419,321.

Patented Jan. 14, 1890.

Fig: 1.

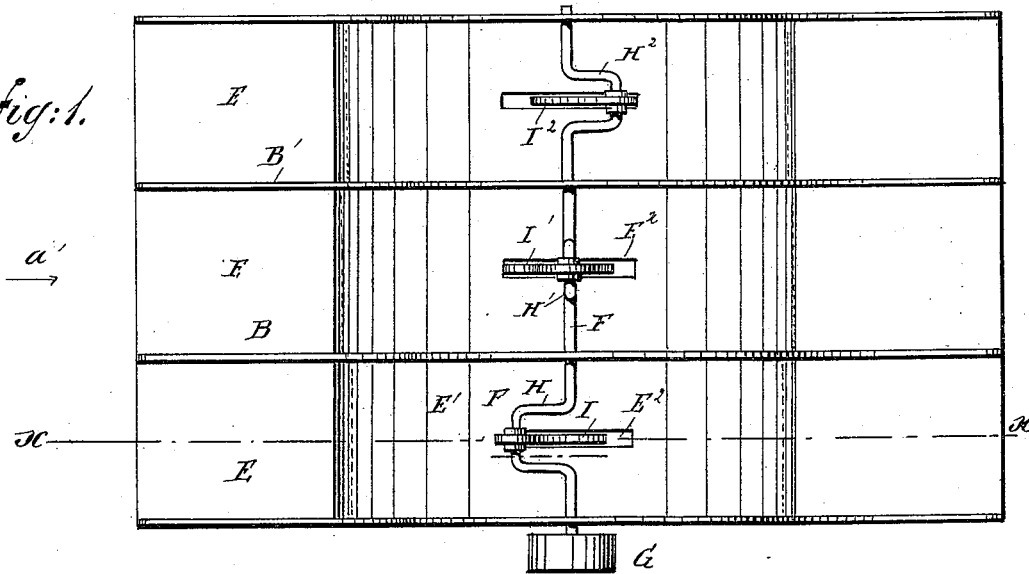


Fig: 2.

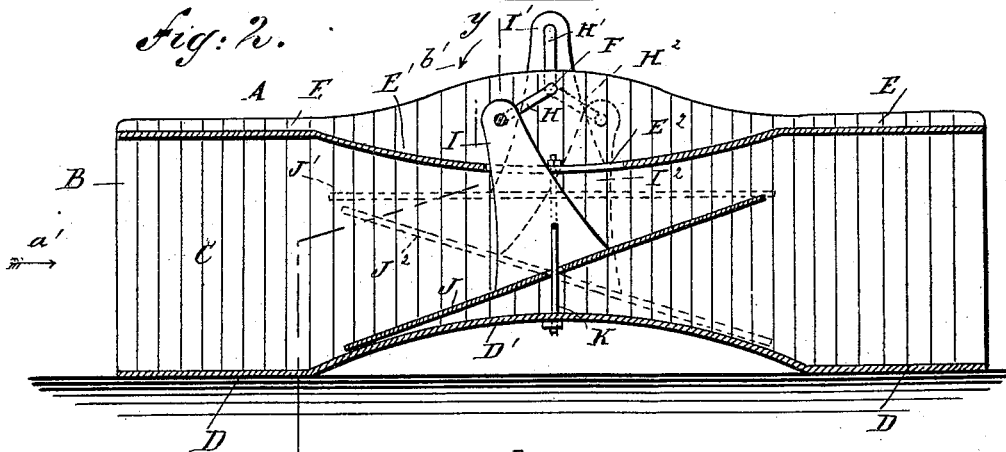
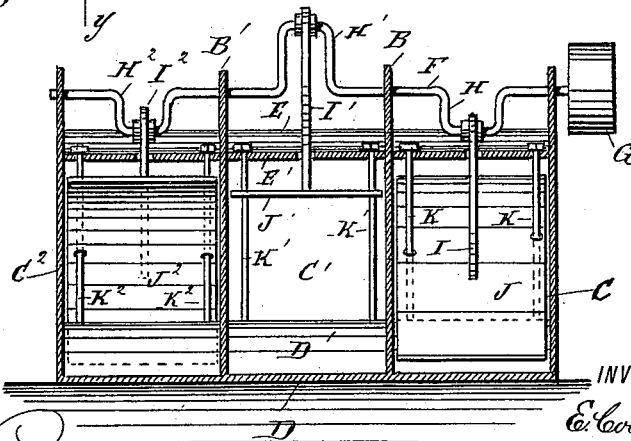


Fig: 3.



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EDGAR COURTRIGHT, OF ST. IGNACE, MICHIGAN, ASSIGNOR OF THREE-
FOURTHS TO THOMAS I. EVERETT, STELLWAGEN & KYNOCH, AND
BROOKS BROS., ALL OF SAME PLACE.

WATER-MOTOR.

SPECIFICATION forming part of Letters Patent No. 419,321, dated January 14, 1890.

Application filed March 26, 1889. Serial No. 304,808. (No model.)

To all whom it may concern:

Be it known that I, EDGAR COURTRIGHT, of St. Ignace, in the county of Mackinac and State of Michigan, have invented a new and Improved Water-Motor, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved water-motor, which is simple and durable in construction, very effective in operation, and utilizes the power of the water to the fullest advantage under any given head or current.

The invention consists of certain parts and details and combinations of the same, as will be fully described hereinafter and then pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a plan view of the improvement. Fig. 2 is a longitudinal sectional elevation of the same on the line xx of Fig. 1, and Fig. 3 is a transverse section of the same on the line yy of Fig. 2.

The improved water-motor is provided with a box A, adapted to be placed in the stream or current in which the motor is to be used. The box A is open at its ends, and is preferably provided with a number of longitudinally-extending partitions B B', &c., dividing the box A into several longitudinal compartments C C' C², &c. The bottom D of the box A is straight near its ends, and is provided in its middle with an upwardly-curved part D', and a similarly downwardly-curved part E' extends directly over the part D' in the top E of the box A.

In the sides and in the partitions B and B' of the box A is mounted in suitable bearings on the top of the box a transversely-extending shaft F, located in the vertical center of the curved parts D' and E' of the bottom and top of the box A. On the outer end of the shaft F is secured a pulley G, for transmitting the motion of the said shaft to other machinery. Other suitable means may be employed for transmitting a rotary motion of the shaft F to other machinery. On the shaft F are arranged a number of crank-arms H H' H², &c., located directly above the respective compartments C C' C², &c. The crank-arms

H H' H² are set at angles to each other, so as to overcome any dead-center when the motor is in operation. The crank-arms H, H', and H² are pivotally connected with the arms I, I', and I², respectively, extending downward through suitable slots E², formed in the curved part E' of the top E. The lower ends of the arms I, I', and I² extend into the respective compartments C, C', and C², and are rigidly connected with the paddle-blades J, J', and J², respectively, extending at right angles to the respective arms I, I', and I², and of the same width as the respective compartments C, C', and C².

The paddle-blades J J' J² are mounted to slide vertically on sets of guide-rods K, K', and K², secured in the vertical center of the curved parts D' and E' of the bottom and top, respectively, of the box A. The paddle-blades are mounted on the said sets of rods in such a manner as to be free to oscillate on the same, as is clearly illustrated in Fig. 2. The sets of guide-rods K, K', and K² are all radial to the shaft F.

The operation is as follows: The box A is set into the stream or current so that the water will flow through the box in the direction of the arrow a' , passing through the several compartments C, C', and C². The several paddle-blades J, J', and J² are always in an inclined position in the respective compartments, so that the current of water on the said blades presses on the same, thereby causing a rotary motion of the main shaft in the direction of the arrow b' . It is to be understood that when, for instance, the first paddle-blade J is in the position shown in Fig. 2 the water presses against the upper right-hand end of the paddle-blade, and consequently causes a downward swinging motion of the blade J on the guide-arms K, so that the arm I, acting on the crank-arm H, swings the latter downward and constantly turns the shaft F in the direction of the arrow b' . At the same time that this takes place the paddle-blade J² stands in the position indicated in dotted lines in Fig. 2 and shown in full lines in Fig. 3. The left-hand end of this paddle-blade is raised, so that the water pressing against the under side of the paddle-blade raises the same, whereby its arm I² presses upward, and acting on the crank-arm

H^2 causes the latter to swing upward, thereby again turning the shaft F in the direction of the arrow b' . The middle paddle-blade J' during the operation of the first two has a horizontal position, but changes its position as soon as the water acts on the first two paddle-blades, as above described—that is, the left-hand end of the paddle-blade J' commences to swing downward by the action of the other two paddle-blades, so as to assume a position similar to that shown in Fig. 2 of the paddle-blade J. The water then acts on the paddle-blade J' in the same manner as above described in reference to the paddle-blade J. It will be seen that when the left-hand end of one of the paddle-blades swings downward, as before mentioned, its left-hand end comes nearly in contact with the left-hand end of the curved part D' of the bottom D, and when the right-hand end of one of the paddle-blades swings downward it is nearly in contact with the right-hand end of the curved part D' of the bottom D. Thus it will be seen that the paddle-blades roll off of the curved part D' of the bottom D when changing their respective lowermost positions, and in a similar manner the paddle-blades will roll off of the inwardly-curved part E' of the top E of the box A when in their uppermost positions. As the several crank-arms H, H' , and H^2 are set at angles to each other, the several paddle-blades constantly assume different positions and are acted on by the current of water, so that a constant rotary motion is imparted to the main driving-shaft F. It is to be understood that the water may also enter at the right-hand end of the box A and pass through the same, acting on the paddle-blades; but then the main driving-shaft F will be turned in the inverse direction of the arrow b' . It will further be seen that the paddle-blades always present to the incoming water an obstructing-surface, against which the water acts, the upstream end of the box being the point of entrance and the other end constituting the point of discharge for the water. The water exerts a straight pressure in the direction of its travel against the paddle-blades both when first coming in contact with the blade in the position shown in Fig. 2, and again when the water has passed the center of the curved parts D' and E' . The paddle-blade J, J' , or J^2 is thus oscillated on its respective guide-rod K, K' , or K^2 , thereby changing the angle of obstruction of the paddle-blade to the side opposite that above mentioned. A continuous rotary motion is thus imparted to the main shaft F, the dead-weight combined with the impulse of the water under any given head or rapid current being fully utilized.

This motor can be used in any stream, and in many streams in which water-motors as heretofore constructed are impracticable. The motor can also be used in tide-water, using the tide as motive agent.

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

1. In a water-motor, the combination, with a water-channel, of paddle-blades loosely mounted in the channel and each provided with an upwardly-projecting arm and a crank-shaft above the blades to which the arms of the blades are connected, substantially as and for the purpose specified.

2. In a water-motor, the combination, with a channel, of paddle-blades centrally and loosely mounted in the channel and each provided with an upwardly-projecting central arm, and a crank-shaft above the blades and to the cranks of which the arms of the blades are pivotally connected, substantially as herein shown and described.

3. In a water-motor, the combination, with a box open at both ends and divided into compartments, of paddle-blades mounted to oscillate one in each of the compartments of the box and provided with upwardly-projecting arms, and a crank-shaft journaled in the box above the blades and to which the arms of the blades are pivotally connected, substantially as described.

4. In a water-motor, the combination of an open-ended box divided into compartments, and having an upwardly-curved central portion in its bottom and a downwardly-curved central portion in its top, paddle-blades mounted to oscillate one in each of the compartments of the box and provided with upwardly-projecting arms, and a crank-shaft journaled in the box above the blades and to which the arms of the blades are pivotally connected, substantially as herein shown and described.

5. In a water-motor, the combination, with an open-ended box divided into compartments, of vertical guide-rods in each compartment, paddle-blades mounted loosely on the said rods and provided with upwardly-projecting arms, and a crank-shaft mounted in the box above the blades and to which the arms of the blades are pivotally connected, substantially as described.

6. In a water-motor, the combination, with an open-end box divided into compartments and having the middle portion of its top and bottom curved inward toward each other, of vertical guide-rods in the compartments, paddle-blades mounted loosely on the guide-rods and provided with central and upwardly-extending arms projecting through slots in the top, and a shaft journaled in the box above the blades, and provided with a series of cranks to which the arms of the blades are pivotally connected, substantially as herein shown and described.

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Witnesses:

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