

Dec. 15, 1925.

W. E. DAMON

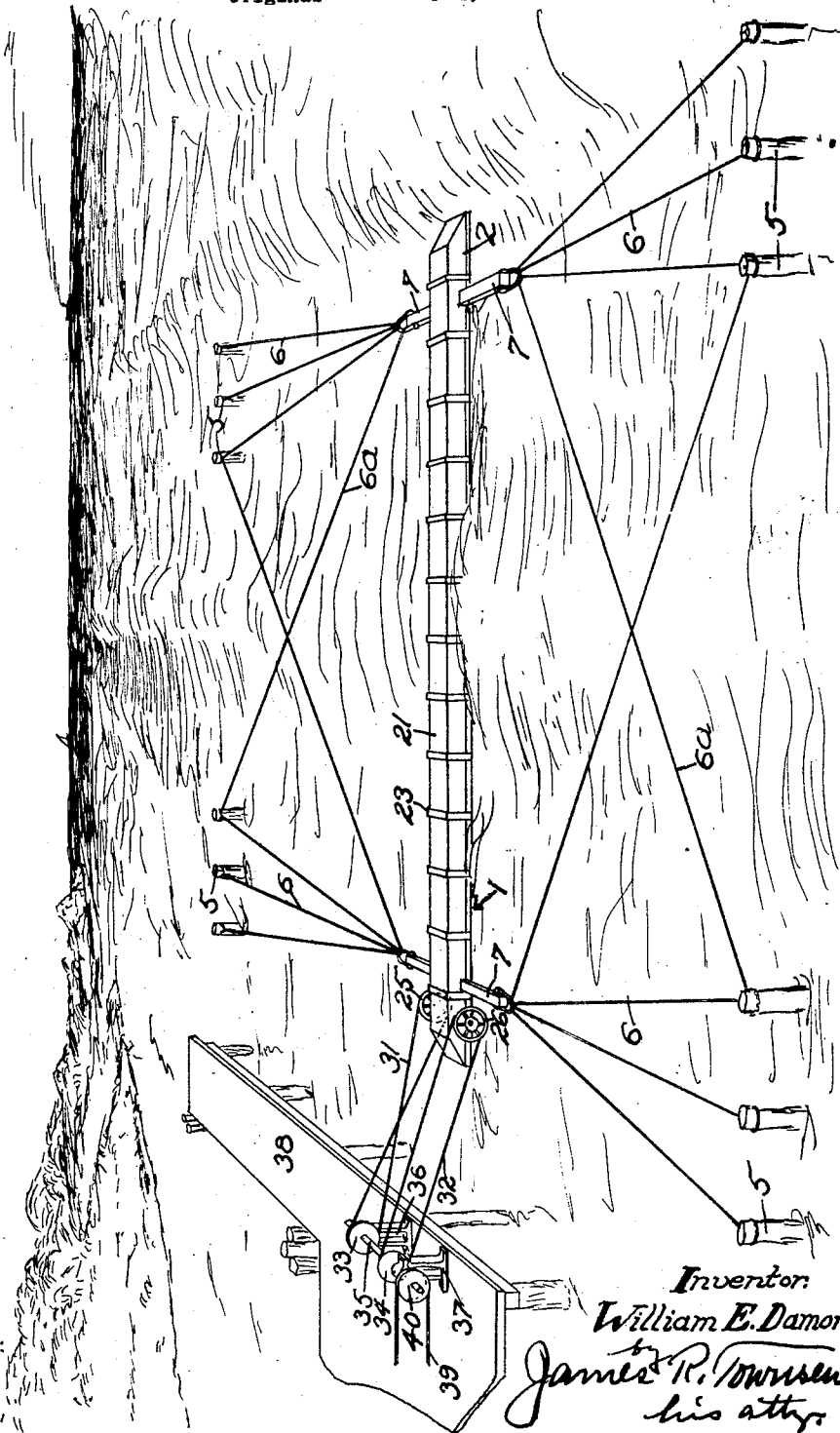
1,565,910

DEVICE FOR UTILIZING THE POWER OF FLOWING WATER

Original Filed May 4, 1921 2 Sheets-Sheet 1

Fig. 1

Witness:
Twipple



Inventor:
William E. Damon.
by
James R. Townsend
his atty.

Dec. 15, 1925

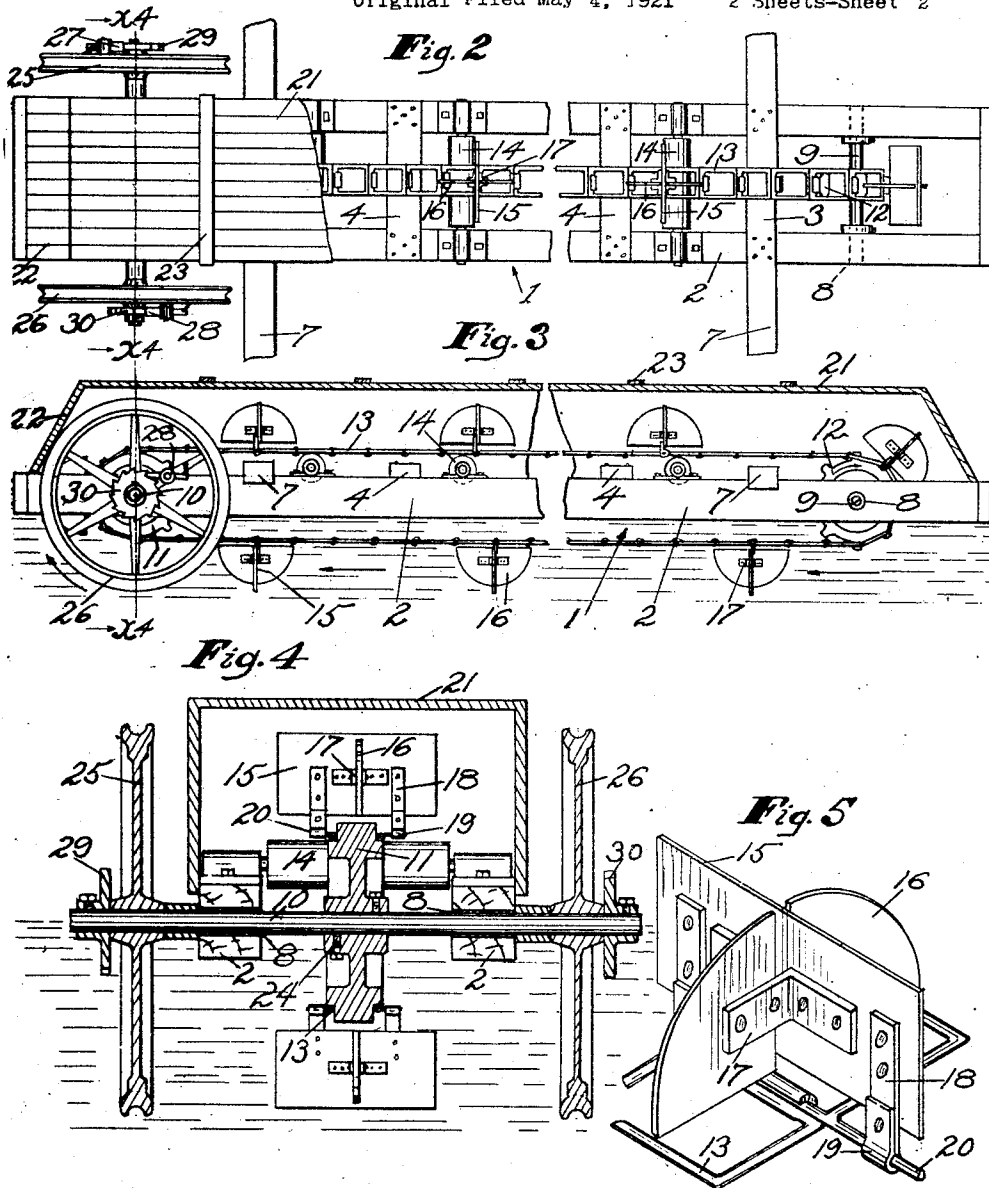
W. E. DAMON

1,565,910

DEVICE FOR UTILIZING THE POWER OF FLOWING WATER

Original Filed May 4, 1921

2 Sheets-Sheet 2



Witness:
J. Whipple

Inventor:
William E. Damon.
James R. Townsend
his atty

UNITED STATES PATENT OFFICE.

WILLIAM EDGAR DAMON, OF INGLEWOOD, CALIFORNIA.

DEVICE FOR UTILIZING THE POWER OF FLOWING WATER.

Application filed May 4, 1921, Serial No. 466,661. Renewed July 21, 1925.

To all whom it may concern:

Be it known that I, WILLIAM EDGAR DAMON, a citizen of the United States, residing at Inglewood, in the county of Los Angeles and State of California, have invented and discovered a new and useful Device for Utilizing the Power of Flowing Water, of which the following is a specification.

10 An object of my invention is to provide simple, inexpensive and effective means whereby power may be generated from flowing water as from a stream or from the flow resulting from the rise and fall of the
15 tides.

Another object of the invention is to provide means whereby counter influences to the general direction of flow of the water may be eliminated.

20 The first of these objects is accomplished by providing a float on which are journaled pulleys spaced apart in a horizontal plane and about which is trained an endless belt or chain having propeller blades extending therefrom; the lower reach of the chain
25 being adapted to dip into the water and to be moved thereby in the direction of the flow, the upper reach being elevated above the water; and one of the pulleys
30 being connected to drive wheels from which power may be transmitted by belts to a place where work is to be done.

Another object of the invention is to provide means whereby when the device is used
35 in water having a reciprocating flow as in or just outside the surf, a continuous movement in one direction may be obtained.

The propeller blades mounted in the above described manner are subjected to a
40 heavy pressure and it is necessary to provide bracing means to brace the propellers against such pressure. At the same time it is important that the flexibility of the belt or chain should not be interfered with
45 in any manner; and this is of especial importance when the belt is passing around the pulleys.

It is an object of the invention to provide means which will effectively brace the
50 propellers against pressure exerted thereon and which at the same time, will in no way interfere with the flexibility of the belt.

Another object is to provide a device
55 which is strong and durable and which will resist the destructive influences of tides, waves and weather,

Other objects, advantages and features of invention may appear from the accompanying drawing, the subjoined detail description and the appended claims. 60

The accompanying drawing illustrates the invention.

Figure 1 is a perspective view of the device anchored in the sea, and showing the
65 manner of anchoring the same and the arrangement of belts for obtaining a direct drive, from the reversing movement of the power generating mechanism of the device.

Fig. 2 is a plan view of the device part
70 of the cover being broken away to show the relation of the pulleys, endless belt and propellers to each other.

Fig. 3 is a side elevation of the device with the cover in section; and showing the
75 relation to each other of the belt, pulleys, and of the propellers in various stages of their course of revolution.

Fig. 4 is a detail view on an enlarged
80 scale, compared with Figs. 2 and 3 showing the relation of the drive wheels to the shaft on which they are mounted and to the pulleys.

Fig. 5 is a perspective detail view of
85 propeller blade on an enlarged scale compared with Figs. 2 and 3 showing the relation of the bracing wings thereto and the manner of its mounting to the chain or belt.

1 designates a float which is in the form
90 of a frame comprising longitudinally extending members 2 and cross members 3 secured together; the cross members 3 being preferably spaced a considerable distance from the ends of the members 2 to
95 allow space for the mounting of pulleys to be described. The members 2 and 3 may be heavy beams of wood or floats of any other character found to be practicable or desirable, and the structure may be
100 strengthened by additional cross members 4.

The float is adapted to rest on the surface
105 of the water and to be held practically stationary by suitable anchoring means which may be in the form of piles 5 driven into the bottom of the stream or in the ocean bed as the case may be, and to which are
110 attached cables 6; the opposite ends of said cables being attached to the float and preferably to the ends of the cross members 3 which are extended as shown at 7 laterally beyond the longitudinally extending frame

members 2. As shown there are three cables attached to each cross beam on each side of the float, and extending each to a pile, arranged preferably in sets of three, but the number may be varied to suit conditions. Steadying cables 6^a may be provided running from each set of piles diagonally to the cross beams as shown in Fig. 1.

The longitudinally extending members 2 are provided adjacent both ends with coaxial bearings 8 in which are respectively journaled the shafts 9 and 10. Mounted upon the shafts are pulleys 11 and 12, which may be in the form of sprocket wheels and about which is trained an endless belt or chain 13 for a purpose which will later appear.

When the float is placed in the water the lower reach of the belt or chain lies beneath the surface of the water while the upper reach is elevated above said surface and rollers 14 or other suitable means may be provided to support the upper reach against sagging. Extending transversely on both sides of the belt are suitable propeller members 15 which are in the form of flat blades or flanges of boiler iron or other suitable sheet material adapted to extend approximately at right angles to the belt. The propeller members, when in flowing water are moved thereby in the direction of flow revolving the belt about the pulleys.

In order that the propeller members may be held at right angles to the belt, and be braced against the pressure exerted on the sides thereof by water, suitable brace members in the form of wings 16 are attached to both sides thereof and extend at substantially right angles to both the propellers 15 and to the plane of the belt 13. The brace members 16 are preferably located centrally of the belt, but have no connection with the belt, and are connected to the propeller by suitable means, as by straps 17 which may be bolted, riveted or otherwise securely fastened to both the propeller and to the brace members. The propellers are pivotally secured to the belt or chain by means of straps 18 having journal bearings 19 in the ends thereof which cooperate with journal members 20 extending laterally from both sides of the belt or of certain links of the chain 13. By this construction and mounting of the propellers on the belt or chain the propeller is properly braced. At the same time the flexibility of the chain is no way interfered with and the chain may pass about the pulleys or sprocket wheels without binding action between the chain and bracing members.

In order to eliminate interference with the movement of the endless chain in the direction of the general flow of the stream or tide, a cover 21 is provided for the float which is securely fastened thereto, entirely

enclosing the upper side thereof and preventing waves and other superficial disturbances from operating upon the upper reach of the belt. The cover 21 preferably slopes at both ends as shown at 22 and is bound to the beams 2 by suitable means as by straps 23 of heavy sheet metal.

In the device as above described I have provided a mechanism which may be placed in a stream or in the ocean or any place where there is a steady or periodic flow of water, and when anchored in the above manner, the water will act on the propellers causing the belt to revolve and in consequence the pulleys to rotate.

One of the shafts 10 may be keyed as at 24 to its corresponding pulley 11 to rotate therewith and on the ends of the shaft 10 may be mounted drive wheels 25 and 26 from which power may be transferred by means of belt or other connections to a suitable place for utilizing the same.

When employing the device to obtain power from water flowing alternately in reverse directions, suitable reversing mechanism may be employed whereby direct motion in one direction may be obtained from the alternately reversing movement of the endless belt. One form of reversing mechanism may be provided as shown in the drawings, by mounting the drive wheels 25 and 26 loosely on the shaft 10, and providing ratchets 27 and 28 secured one to each wheel and ratchet wheels 29 and 30 keyed to shaft 10; the ratchet wheels being adapted to cooperate respectively with the ratchets. For this purpose the ratchet wheels have the teeth thereof facing in opposite directions and the corresponding ratchets being oppositely mounted so that the drive wheels will each rotate with the shaft in only one direction and in opposite directions of rotation of said shaft.

Belts or cables 31 and 32 run from the drive wheels 25 and 26 to pulleys 33 and 34 on a driven shaft 35, which may be journaled in suitable bearings 36 and 37 secured to a wharf 38, or other suitable support. One of the belts 31 may be crossed and the other 32 may run straight, as shown. Keyed to shaft 35 is a pulley 40 about which may be trained a belt 39 running to mechanism, not shown, where the power is to be utilized.

By the arrangement of pulleys, drive wheels, ratchets and belts above set forth a direct continuous movement of the belt 39 may be obtained from a fluctuating or reversing movement of the water in which the float is anchored and the reversing of the mechanism will occur automatically and without the attendance of an operator.

In use, the device, which may be 30 or 40 feet long by about 4 feet wide, is placed with the propeller blades at right angles to the flow of water and secured to piles or other

suitable anchoring means. The drive wheels may then be connected by belts to driven mechanism when the device will be operated continuously by the flow of the water; the
5 water exerting pressure against the propellers moving them along in the direction of the flow and rotating the pulleys and drive wheels as set forth above.

I claim:

10 1. A device for utilizing power of flowing water, comprising an endless chain trained about spaced pulleys mounted on a float, one stretch of said chain being above and the other stretch below the surface of
15 the water, certain of the links of said chain having lateral projections, on opposite sides of said chain, propellers pivotally secured to said projections, and means to limit the pivotal movement of said propellers.

20 2. A device for generating power from flowing water comprising a substantially stationary float; spaced pulleys mounted on said float; an endless chain composed of

links trained about said pulleys; journal members extending laterally from both sides
25 of certain links of said chain; propellers extending transversely on both sides of said chain; means pivotally connecting said propellers to said journal members; and means connected to one of said pulleys and adapted
30 to be driven in one direction by rotation of the pulleys in either direction.

3. In a device for generating power from water flowing in opposite directions the combination of spaced pulleys; an endless member
35 revolubly mounted on said pulleys; propeller members secured to and extending on both sides of said endless member; and means connected to one of said pulleys and adapted to be driven in only one direction
40 by rotation of the pulleys in either direction.

In testimony whereof, I have hereunto set my hand at Los Angeles, California, this 23rd day of April, 1921.

WILLIAM EDGAR DAMON.