No. 804,676. PATENTED NOV. 14, 1905.

J. ROEH.

AUTOMATIC CURRENT MOTOR.

APPLICATION FILED FEB. 6, 1905.

2 SHEETS—SHEET 1.

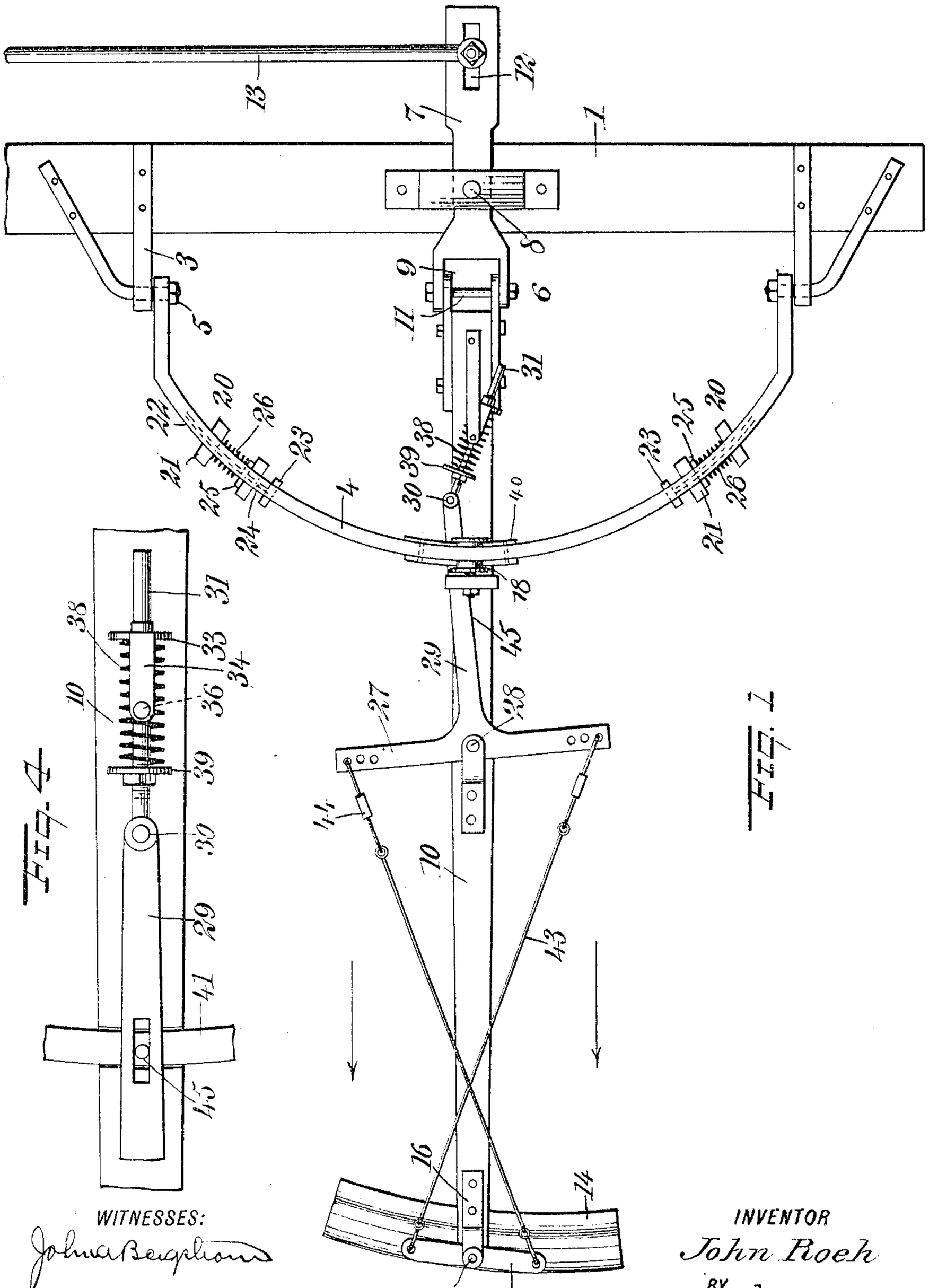

FIG. 1.

FIG. 4.

WITNESSES:

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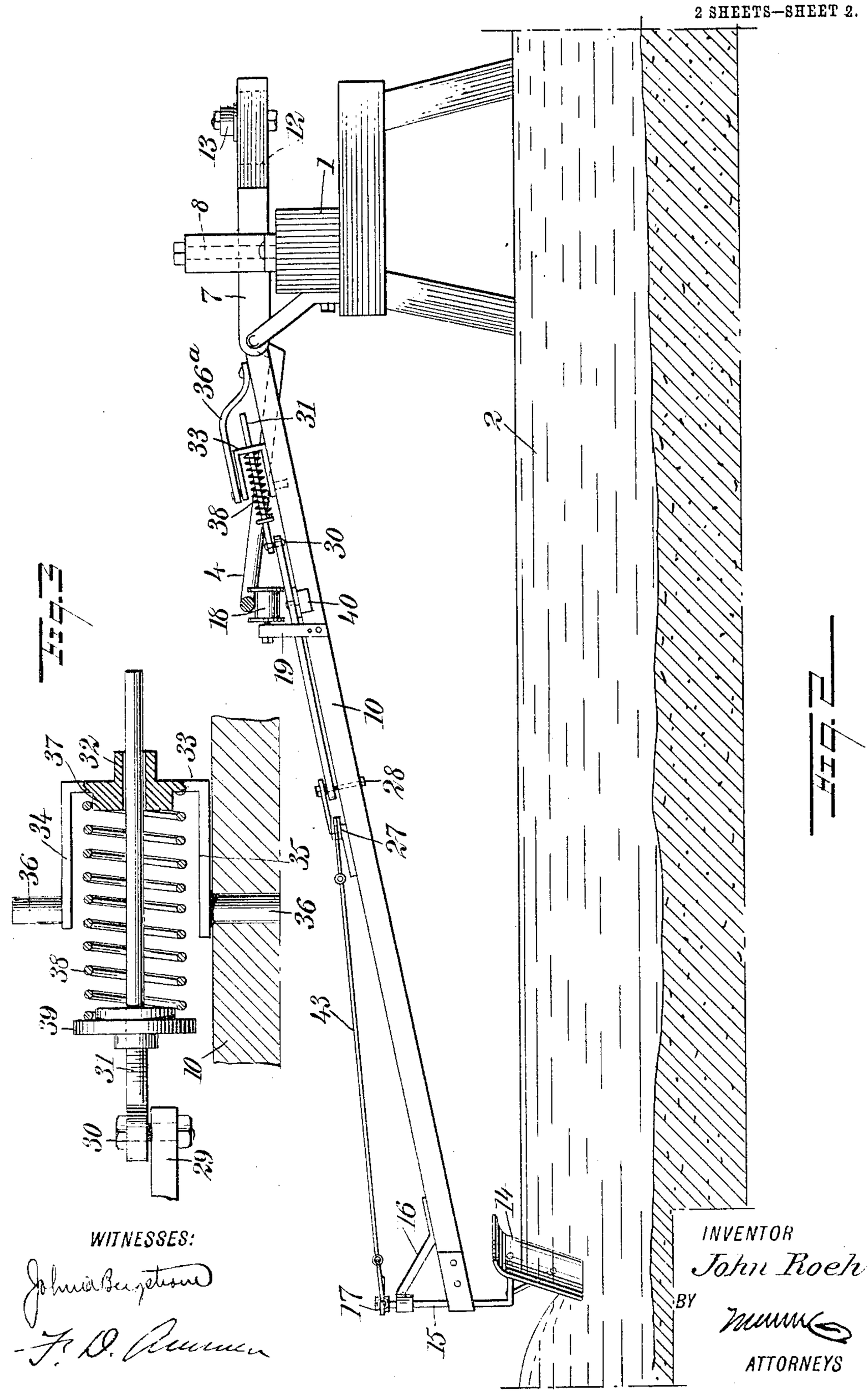

FIG. 2.

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UNITED STATES PATENT OFFICE.

JOHN ROEH, OF SPOKANE, WASHINGTON, ASSIGNOR TO THE CURRENT MOTOR AND IRRIGATION COMPANY, OF SPOKANE, WASHINGTON.

AUTOMATIC CURRENT-MOTOR.

No. 804,676. Specification of Letters Patent. Patented Nov. 14, 1905.

Application filed February 6, 1905. Serial No. 244,377.

To all whom it may concern:

Be it known that I, JOHN ROEH, a citizen of the United States, and a resident of Spokane, in the county of Spokane and State of Washington, have invented a new and Improved Automatic Current-Motor, of which the following is a full, clear, and exact description.

This invention relates to automatic current-motors to be used for utilizing the power of moving currents, such as those of streams and rivers.

The invention concerns itself especially with that type of current-motor which contemplates the use of a vane carried in the water and operating so as to be automatically tripped to reverse its position upon its sweep.

The object of this invention is to simplify and improve the construction of the tripping mechanism with a view to giving the same a desirable flexibility.

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

Figure 1 is a plan view of a current-motor constructed according to my invention. Fig. 2 is a side elevation and illustrating the application of the device in practice. Fig. 3 is a vertical central section taken through certain parts shown in Fig. 4 and illustrating the construction of the reversing or tripping mechanism, some of the parts being represented in elevation and broken away; and Fig. 4 is substantially a plan view of the parts shown in Fig. 3.

Before proceeding to a detailed description of the parts it should be said that this invention is an improvement upon the automatic current-motor which is the subject of the patent granted to me July 29, 1902, No. 705,967.

Referring particularly to the parts ,1 represents a beam which is adapted to be supported in any suitable manner transversely of a stream 2. At a suitable point this beam is provided with rearwardly-projecting arms 3, and near their extremities a bow 4 is pivotally attached by means of nuts 5, as shown. The purpose and the details of the construction of this bow appear more fully hereinafter. At a point substantially midway between the arms 3 a sweep 6 is mounted, which sweep comprises a body 7 pivotally mounted at 8 upon the upper side of the beam, as indicated. This body 7 on the downstream side has a bifurcated head 9, upon which is pivotally attached an arm 10 by means of a substantially horizontal pivot-bolt 11. The said arm 10 preferably tapers toward its extremity and projects in the direction in which the current flows downstream.

The upstream side of the body 7 is provided with a longitudinally-disposed slot 12, which facilitates the adjustable connection of a connecting-rod 13, which leads longitudinally with respect to the beam 1 and which may be utilized to operate a pump or other device. At the extremity of the arm 10 a vane or blade 14 is attached to a vertical stem 15, said stem being supported in any suitable manner by means of a bracket 16, as indicated. To the upper extremity of the stem 15 a tiller 17 is rigidly attached. The vane 14 is preferably slightly curved, as viewed in plan, as indicated in Fig. 1, and the tiller 17 preferably is disposed parallel with a tangent at the middle point of the vane, as will be readily understood. The arm 10 will normally be disposed in an inclined position just above the stream 2, so that the vane 14 will be held in water, and the aforesaid bow 4 is disposed a short distance above said arm and is supported thereupon by means of a roller 18, the axis of the said roller being disposed substantially parallel with the direction of the arm and mounted upon suitable brackets 19.

The bow 4, referred to above, is preferably formed in an arc of a circle struck with the axis of the bolt 8 as a center. Near its extremity this bow is provided with tripping devices 20, which comprise brackets 21, constituting guides for plungers 22. Each plunger has an enlarged head 23 and a stem 24. The plungers are guided through the brackets, as indicated. Upon the stems 24 collars 25 are rigidly attached, and springs 26 thrust against these collars and normally maintain the plungers with their heads extended inwardly toward the arms 10. These plungers constitute buffers for arresting the oscillations of the sweep 6 and for reversing its movements.

For the purpose of controlling the position of the vane 14 and for locking the same in its two extreme positions I provide a cross-head 27, which is pivotally mounted upon the up-

per side of the arm 10 at 28 in any suitable manner. The body 29 of this cross-head constitutes an arm which extends substantially longitudinally with the arm 10, passing under the bow 4, as shown. At its extremity it makes a pivotal connection 30 with a stem 31, which stem is slidably mounted through a guide-opening 32, formed at the base of a stirrup 33. Said stirrup comprises oppositely-disposed arms 34 and 35, which are provided, respectively, with pintles 36. One of these is rotatably mounted in the arm 10, as shown, and the other is similarly mounted in a brace 36[a]. Concentrically disposed with respect to the bore 32 a boss 37 is formed in the stirrup which affords means for supporting a helical spring 38, the opposite end whereof thrusts against a head 39, which is carried rigidly by the stem, as will be readily understood. From this arrangement the pivotal connection 30 constitutes, as it were, a toggle-joint, and the spring 38 thrusting, as it does, against the head 39, affords means for holding the cross-head 27 in either of two extreme postitions. This spring 38 not only affords means for locking and resiliently holding the cross-head in either of these extreme positions, but it also affords means for bringing the cross-head to one of its extreme positions if the pivotal joint 30 should be moved past the central axis of the arm 10. In order to enable the cross-head to be thrown in this manner from one of its extreme positions to the other, I provide a trip 40, the body 41 of which is preferably curved and mortised into the upper side of the arm 10, as indicated most clearly in Fig. 4, in such a manner that the trip will be guided so as to slide transversely of the arm. The trip is so placed that its extremities may strike the plungers 22 aforesaid as the arm swings from side to side. The opposite extremities of the cross-head 27 are connected with the extremities of the tiller 17 by means of crossed links or tie-bars 43, said tie-bars including turnbuckles 44 for the purpose of making suitable adjustments. By reason of this connection between the cross-head 27 and the vane 14 the position of the vane will depend upon the position of the cross-head. Furthermore, as will be inferred from the foregoing, the cross-head reverses itself automatically through the medium of the tripping devices 20 at the termination of each oscillation.

The mode of operation of the apparatus and especially of the tripping mechanism will now be described.

It should be understood that when the cross-head 27 is in a centrally-disposed position the vane 14 will be disposed substantially at right angles to the arm 10, so that no turning effect would be exerted on the arm by the current of the stream flowing in the direction of the arrows shown near the arm. However, when the cross-head occupies some such position as that indicated in Fig. 1 the vane will be thrown into an extreme position, so that it presents itself in an inclined position to the force of the current. In this way it operates to utilize the current's force in producing a swinging movement of the arm 10 and sweep 6 upon the pivot 8. When the sweep has moved sufficiently far in either direction, the trip 40 will come against one of the heads 23 of the tripping devices 20. The motion of the sweep will be resiliently arrested by the spring 26, and at the same time the trip 40 will be slid toward its opposite position upon the arm. This reversed position of the trip will correspond with the reversed position of the vane, and by reason of a pin-and-slot connection 45 between the trip and the body 29 of the cross-head this movement is brought about.

The flexibility of the means for holding the cross-head 27 in its extreme position is most desirable because in case floating objects are struck by the advancing vane they have a tendency to operate the vane automatically, so as to reverse its direction of movement.

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

1. In a device of the class described, in combination, a support, a member pivoted thereto and adapted to be held in a current, said member having opposite extreme positions, resilient means normally constraining said member in either of said extreme positions, and automatic means for reversing said member.

2. In a water-current motor, in combination, a support, a vane pivoted thereto and adapted to be disposed in the current, said vane having opposite extreme positions, members having a toggle connection controlling said vane and also having opposite extreme positions corresponding to the position of said vane, a spring constraining said members, and automatic means for actuating said members to reverse said vane.

3. In a water-current motor in combination, a support, a vane pivotally attached thereto and adapted to be disposed in the current, said vane having opposite extreme positions, a pivoted member connected with said vane and controlling the same, a spring mounted to constrain said pivoted member toward the extreme position corresponding to the extreme position of said vane, and tripping devices actuating said member to reverse said vane.

4. In a current-motor in combination, a support a sweep pivotally mounted thereupon, a vane carried by said sweep and having opposite positions, a cross-head carried by said sweep and connected with said vane, a stem pivotally connected with said cross-

head, a pivotally-mounted guide for said stem, a spring thrusting against said guide, a head carried by said stem against which said spring thrusts, and tripping devices adapted to actuate said cross-head to reverse the position thereof.

5. In a water-current motor in combination, a support, a pivotally-mounted sweep carried thereby, a vane carried by said sweep and having opposite positions, a pivoted cross-head carried by said sweep and connected with said vane, a stem pivotally attached to said cross-head, a guide for said stem pivotally mounted upon said sweep, a spring surrounding said stem, a head carried by said stem against which said spring thrusts, a trip adapted to slide laterally upon said sweep, a connection between said trip and said cross-head, and tripping devices adapted to engage said trip.

6. In a water-current motor in combination, a support, a sweep pivoted thereon, a vane carried by said sweep and having opposite positions, a cross-head pivotally carried by said sweep and connected with said vane, a stem pivotally attached to said cross-head, a stirrup pivotally mounted upon said sweep and through which said stem may slide, a head carried by said stem, a spring thrusting between said head and said stirrup, a member carried by said sweep and adapted to slide laterally thereupon, tripping devices adapted to engage said member, and a connection between said member and said cross-head.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN ROEH.

Witnesses:
F. W. WILSEY,
E. T. WHITE.