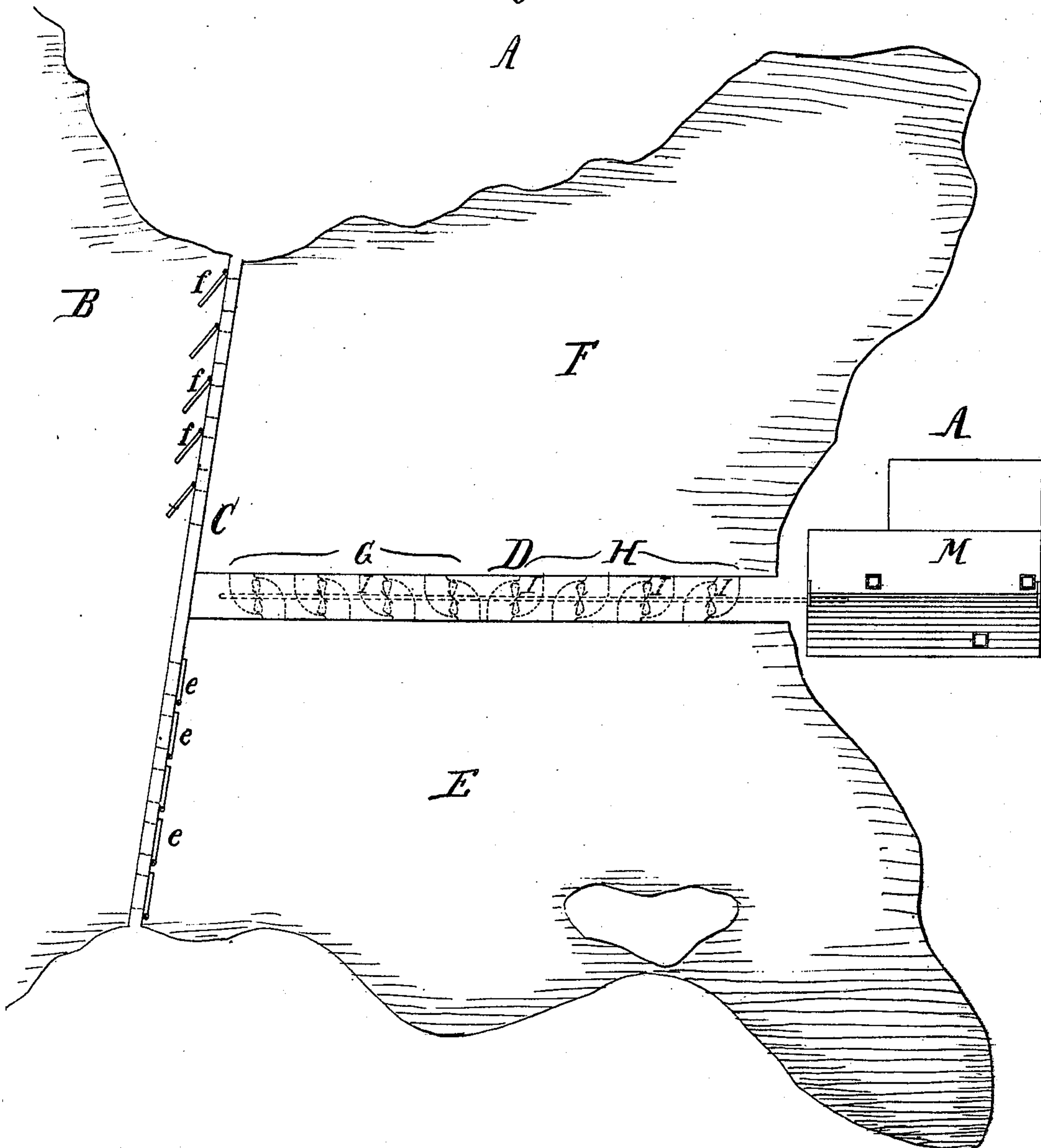


A. MALLORY.  
TIDE-POWERS.

No. 174,692.

Patented March 14, 1876.

Fig: 1.



Witnesses:

Henry Gentner

Chas. C. Stetson

Inventor:

John Mallory  
his attorney

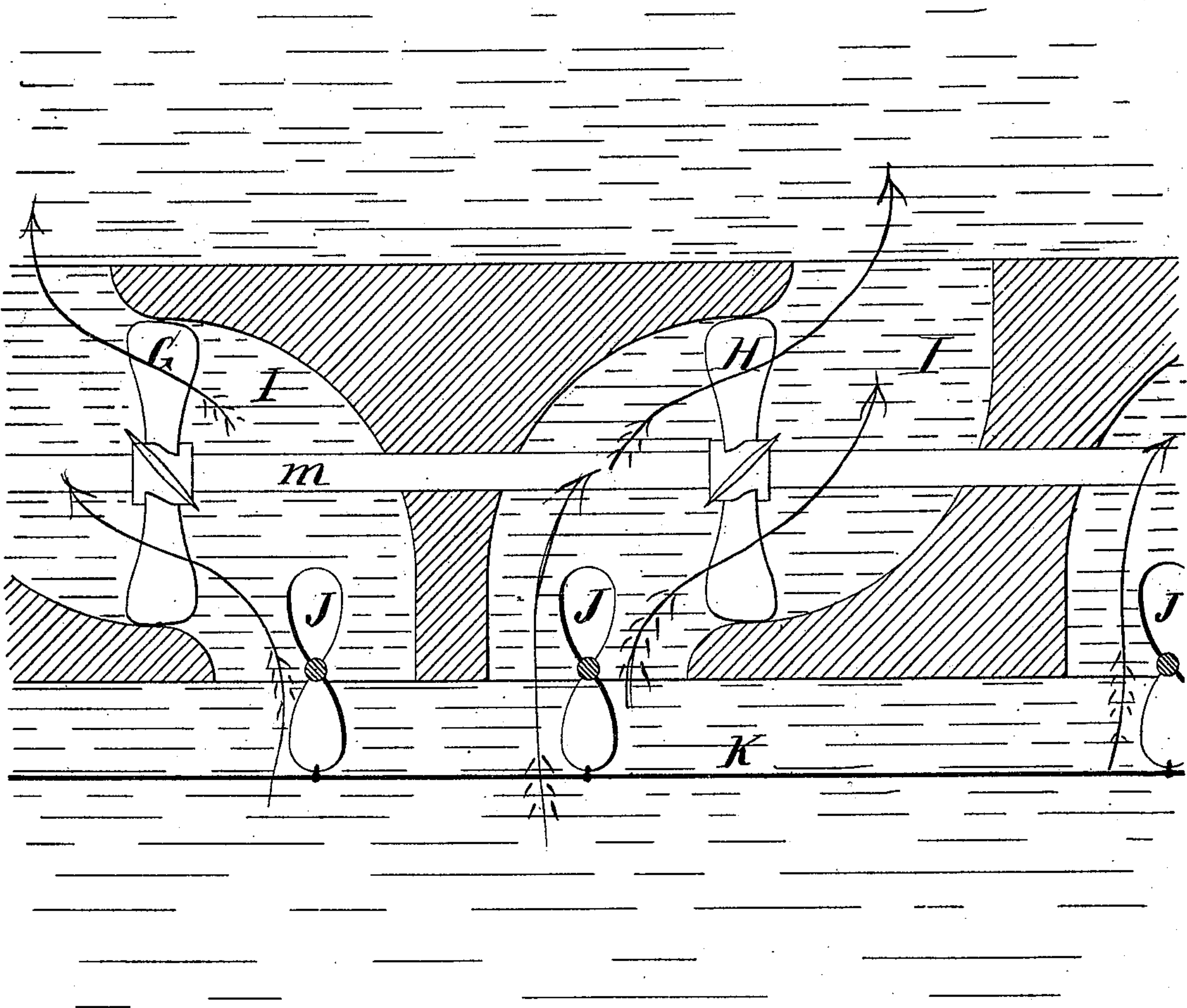
T. D. Stetson

A. MALLORY.  
TIDE-POWERS.

No. 174,692.

Patented March 14, 1876.

*Fig: 2.*



*Witnesses:*

*Henry Gentry*

*Chas. C. Stetson*

*Inventor:*

*Amos Mallory*

*by his attorney*

*J. D. Stetson*



# UNITED STATES PATENT OFFICE.

AMOS MALLORY, OF MYSTIC BRIDGE, CONNECTICUT.

## IMPROVEMENT IN TIDE-POWERS.

Specification forming part of Letters Patent No. 174,692, dated March 14, 1876; application filed August 2, 1875.

*To all whom it may concern:*

Be it known that I, AMOS MALLORY, of Mystic Bridge, New London county, Connecticut, have invented certain new and useful Improvements Relating to Tide-Mills or Tide-Water Power, of which the following is a specification:

My invention renders practicable the utilizing the power of the tides continuously—an end which has before been proposed as desirable, but, so far as I am aware, was never carried any further than the proposing of a high and a low level reservoir with common water-wheels. Such means will not practically attain the end, because the wheel which is right for low water, when the low reservoir is lowered to its extreme limit, and the high one is part-way down, cannot be right when the opposite condition is obtained, and the low reservoir is filled to a half or some other fraction of its capacity. I esteem it impracticable to raise and lower wheels, and ponderous connected parts; but my wheels do not feel backwater, and utilize an immense flow of water, under a low head, with peculiar advantage, and make the two levels of the water practically available.

The accompanying drawings form a part of this specification, and represent what I consider the best means of carrying out the invention.

Figure 1 is a top view of my tide-mill. Fig. 2 is a horizontal section through a part of the cross-dam.

Similar letters of reference indicate like parts in all the figures.

A is the dry land; B, the water, subject to full force of the tidal influence, rising and sinking to the extent of whatever tides may obtain in that locality. C is the dam, dividing the bay from the tide-water B; and D is the cross-dam, dividing the bay into two parts, E F. The mill M is furnished with peculiar means to utilize a small head of water, as will presently be explained. At and near high tide, the water from the ocean B flows freely into the basin E through valves *e* in the dam C. At and near low tide, the water runs out freely from the basin F through the valves *f*. Thus conditioned, the water in the basin F is always considerably lower than the water in

the basin E. The liability of the water to stand at various levels in this system involves a difficulty, which I have met by peculiarly-adapted hydraulic machinery. Through the mill M extends a long horizontal shaft, preferably of hard brass, in one continuous piece or formed of suitable lengths, strongly coupled together to resist a tensile strain. On this shaft, which may be of small diameter, are mounted a considerable number of small screw-propellers. These should be also of brass, or the whole may, if preferred, be of wrought-iron or steel thoroughly coated with brass, zinc, or other protector, and bushed with brass at the bearings. The screw-propellers are in two sets. One set, G, is right-handed; the other set, H, composed of an exactly equal number, of equal size, and of corresponding form, is left-handed. Curved pen-stocks I, formed of masonry or other suitable material, receive the water from the high-level reservoir or pond E, and discharge it into the low-level reservoir or pond F. J J are peculiar gates, analogous to butterfly-valves, operated by a single rod, K, controlled by the attendant at the mill. Each gate J is slightly twisted, for a purpose which will presently appear. The gates J, being properly adjusted, by their opening and closing give greater or less freedom to the flow of the water. In the best condition of the apparatus the valves J stand wide open, and the water is allowed to flow freely, except that it is given a slight helical motion by flowing past the twisted gates J. In passing the screw-propeller, the current of water imparts a rapid rotatory motion thereto, and receives from the inclined position of the blades of the screw-propeller a tendency to a helical motion in the direction opposite to that of the rotation of the screw. This, in the best condition of the apparatus, is only just sufficient to neutralize the effect of the helical motion in the other direction, which it received in passing the gate J, and the water is consequently discharged into the lower pond F without any considerable twisting motion. It simply flows out in a moderate calm current. Supposing six right-handed propellers, G, and an equal number of left-handed propellers, H, to be employed: The end pull on the six propellers



G will all conspire to move the shaft *m* in one direction; but it will be remembered that all the propellers H conspire to pull the shaft *m* axially in the opposite direction. As the propellers H are equal in number and size, and as exactly correspondent in form as possible, the pull in the two directions will be very nearly balanced. One or more collars on the shaft *m*, being held in suitable babbitt boxes, will resist any irregularity or inequality in the pull, and hold the shaft steady. All the bearings L for the shaft should be formed without collars, and should allow the shaft to move endwise at those points as much as required to compensate for variations in temperature, or any changes of position of the apparatus. My shaft *m* may, consequently, be of any length, and carry as many or as few screw-propellers G and H as may be required.

The works may be increased or reduced from time to time by adding or taking away one or more from each side.

My invention gives a quick rotatory motion to the shaft *m*, which can be depended on at

all times of tide. The gearing or belting from this shaft to the other portions of the mill may be of any ordinary or suitable character. The shaft *m* and its adjuncts should be laid sufficiently low to be nearly or quite immersed under all working conditions of the apparatus. Suitable provision should be made to exclude floating masses of wood or ice.

To facilitate repairs, the several screw-propellers G and H may be made in halves, and bolted together around the continuous shaft *m*.

I claim as my invention—

The series of screw-wheels G H and shaft *m*, in combination with suitable controlling means J K, and dams C D, and automatic valves *ef*, as and for the purposes herein specified.

In testimony whereof I have hereunto set my name in presence of two subscribing witnesses.

AMOS MALLORY.

Witnesses:

PHILLIPS ABBOTT,  
J. K. OULAHAN.