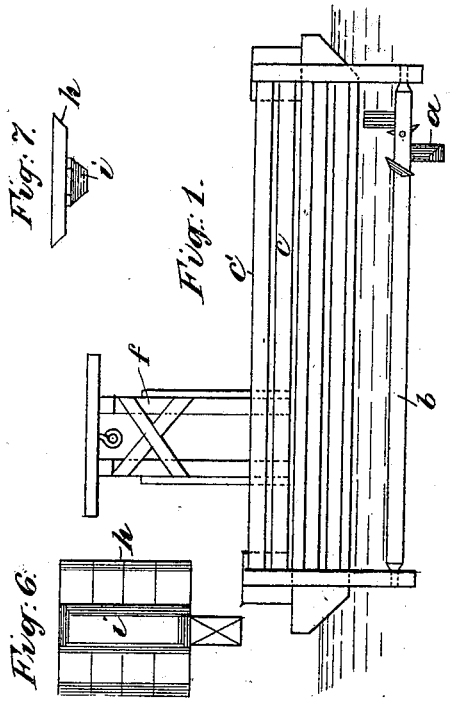
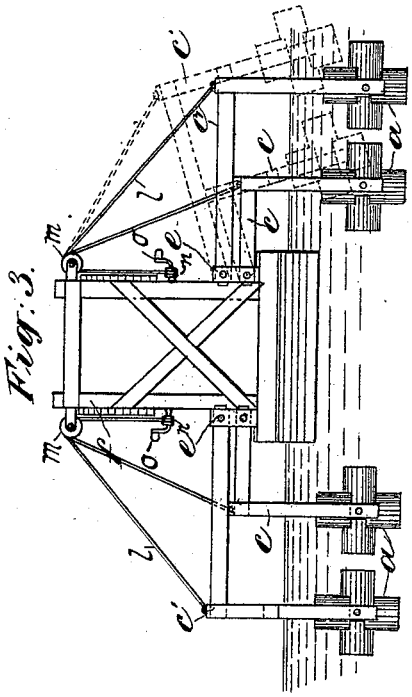
No. 649,084. Patented May 8, 1900.

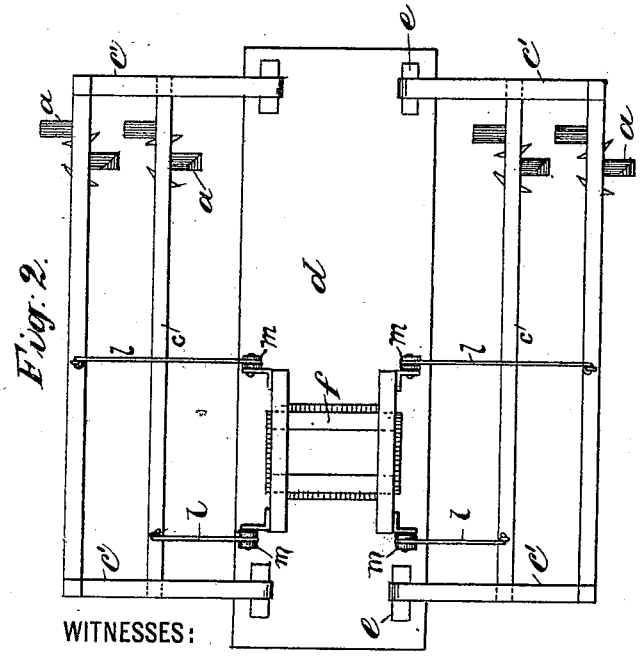
S. N. STEWART.

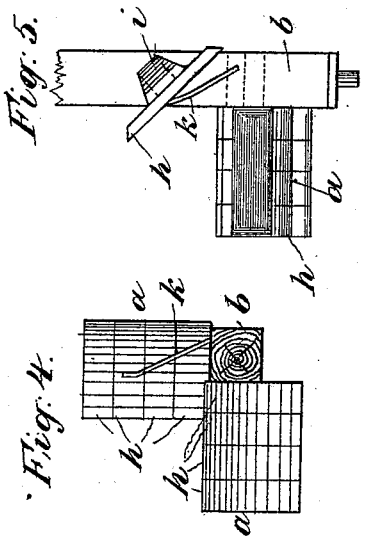
MOTOR DRIVEN BY WATER CURRENTS.

(No Model.) (Application filed Dec. 9, 1898.)









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SYLVESTER N. STEWART, OF VIENNA, AUSTRIA-HUNGARY.

MOTOR DRIVEN BY WATER-CURRENTS.

SPECIFICATION forming part of Letters Patent No. 649,084, dated May 8, 1900.

Application filed December 9, 1898. Serial No. 698,741. (No model.)

To all whom it may concern:

Be it known that I, SYLVESTER N. STEWART, a citizen of the United States of America, residing at 5 Canovagasse, in the city of Vienna, Empire of Austria-Hungary, have invented certain new and useful Improvements in Motors Driven by Water-Currents; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to motors driven by the current of rivers, and has for its object to cheapen the construction of such motors and to increase their efficiency.

The essential part of this motor consists of a kind of screw arranged on a shaft mounted in a frame. This frame is arranged at the side of a suitable boat or vessel and is adapted to be immersed into the water and to be raised therefrom. Such a frame is provided at each side of the boat or vessel; but for more thoroughly utilizing the power of the current two or more such frames may be provided at each side of the boat or vessel. In this case provision is made that one or more of the motors at each side of the boat may be thrown into operation at will. The power obtained by the motors is transmitted by any suitable gearing, such as chain and chain-wheel gearing, to a shaft mounted on the deck of the boat or vessel, which is preferably coupled with the shaft of a dynamo-machine. Thus the mechanical energy of the flowing water is transformed into electrical energy, which may be conducted to workshops and factories erected on shore for being utilized there, or the mechanical energy obtained by the motor may be utilized in any way desired—for instance, for driving machinery of any kind mounted on the boat or vessel itself.

In the accompanying drawings, Figure 1 is a side elevation of a boat provided with the improved motor. Fig. 2 is a plan, and Fig. 3 an end view, thereof. Figs. 4 and 5 show an end elevation and plan, respectively, of the motor proper on a larger scale. Figs. 6 and 7 show details.

As is seen from the figures, the motor is constructed on the principle of a screw-propeller and consists of blades *a*, which for the sake of simplicity and cheapness may be secured to the square shaft *b* without the aid of hubs or bosses, as shown.

The motor—that is to say, the screw and its shaft *b*—is journaled in a frame *c*, pivoted on arms *e*, arranged on the deck *d* of the boat. A similar frame *c'* is also connected to the arms *e*, said frame being located above and extending outside of the frame *c*, as best shown in Fig. 3, said frame *c'* normally resting on the frame *c* and carrying a motor similar to that carried by the frame *c*. By means of suitable hoisting-gear—such as rope *l*, passing over pulley *m* and onto the winding-drum *n*, operated by the handle *o*, mounted on the framework *f*—the frames *c c'* may be raised from the water or lowered into the same, each frame having an independent hoisting-gear. The frames *c c'* might be strengthened at their corners by iron rods or angle-rods.

The dotted lines at the right-hand side of Fig. 3 indicate the position of the frames *c* and *c'* when both are raised. When it is desired to diminish the power, but without stopping it, the frame *c'* is raised out of the current, leaving the frame *c* still in operating position. By raising the frame *c*, however, both frames *c* and *c'* will be raised together.

For deriving a sufficient amount of power from the current the blades *a* are set at angles of approximately thirty degrees and are constructed of wooden boards *h*, secured to an arm *i*, fixed to the shaft *b*, Figs. 5, 6, and 7. The arm *i* is let in the shaft *b*, and its edges and outer end are beveled off at angles.

On comparing only the working surfaces of the blade of the improved screw and those of the screws as heretofore constructed the theoretical efficiency of the former will be found smaller than that of the latter; but considering the losses of power due to friction caused by the great weight the work furnished by the improved screw is greater than that furnished by a screw of the usual construction of the same size. Besides, the latter screw, even if constructed as lightly as practicable, will not be set in motion by a slow current, whereas the herein-described motor will be actuated by the weakest current and is, moreover, much cheaper, its cost of construction being only about one-fifth part of that of an ordinary screw.

The usual screw constructed of iron is well adapted to propel boats, because in this case it works under heavy pressure; but it is by far too heavy and too expensive and has too small a working surface to utilize the low pressure of the flowing water of a river.

The blades *a* are mounted on the shaft *b*, as is shown in Figs. 4 and 5—that is to say, their center lines are at right angles to the axis of the shaft—and the face of the blades exposed to the action of the current forms an angle of thirty degrees or thereabout with such axis. In order to diminish the resistance of the water, the edges of the rectangular blades are beveled, as shown in Figs. 6 and 7. For reinforcing the blades the face of the same is connected with the shaft by an iron rod *k*, Figs. 4 and 5. In order to enable the blades to remove any ice, the edges or faces of the blades should be covered with iron plates. Instead of one screw two or more may be arranged on each shaft *b*.

Owing to the fact that the shaft-carrying frames are so arranged that one extends outwardly and downwardly over the other on each side of the float, the said frames and their shafts may extend the full length of the float, the shafts being side by side or in the same horizontal plane when immersed, each shaft having motion imparted thereto by a volume of water different from that which actuates the next shaft. Therefore each shaft can be made of the utmost length and will also receive and transmit the power from the current undisturbed by any influence on the current by another shaft.

Having thus described my invention and a manner in which it can be constructed, without setting forth all of the various modifications thereof, I declare that what I claim is—

1. A water-current motor comprising a suitable float, a plurality of frames hingedly connected to the side of said float, a shaft carried by each of said frames and provided with angularly-set blades, the said frames extending one over the other whereby they are adapted to support the shafts immersed side by side, and means for raising one of the frames and its shaft independently of the other.

2. A water-current motor comprising a suitable float, a plurality of frames hingedly connected to each side of said float, a shaft carried by each of said frames on each side of the float, each shaft being provided with angularly-set blades, the said frames extending one over the other on each side of the float, whereby they are adapted to support the shafts immersed side by side, and means for raising one of the frames and its shaft independently of the other on each side of the float.

In testimony whereof I affix my signature in presence of two witnesses.

SYLVESTER N. STEWART.

Witnesses:

ALVESTO S. HOGUE,

AUGUST FUGGER.