P. J. HANSEN.

STREAM MOTOR.

APPLICATION FILED MAR. 26, 1907.

**922,890.** **Patented May 25, 1909.**

3 SHEETS—SHEET 1.

Fig 1

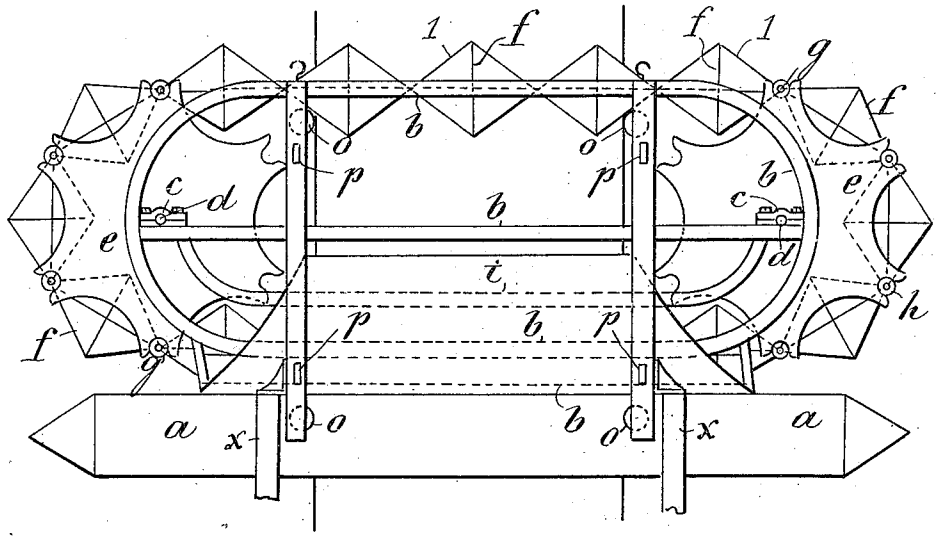
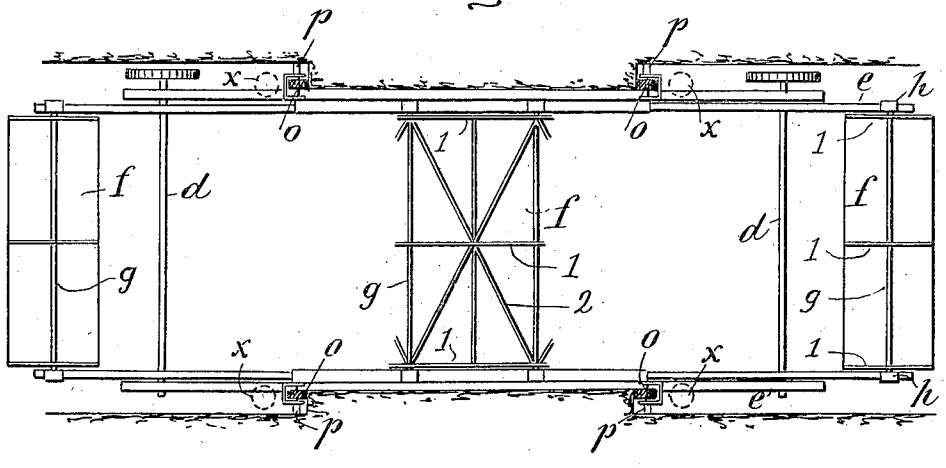



Fig 2




Witnesses

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3 SHEETS—SHEET 2.

Fig 3.

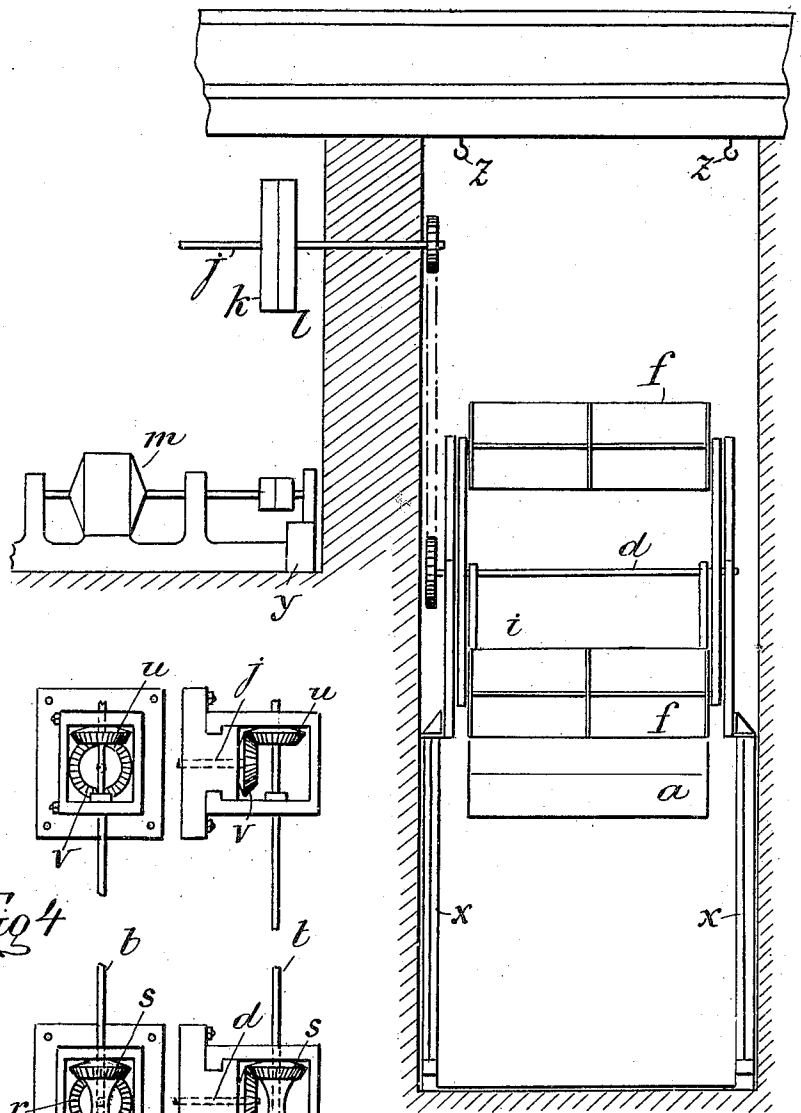





Fig 4




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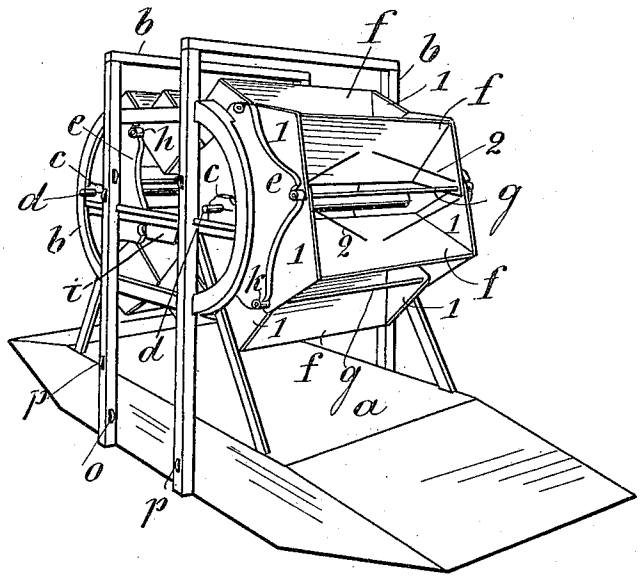
3 SHEETS—SHEET 3.

Fig 5

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Inventor
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# UNITED STATES PATENT OFFICE.

PEDER JÖRGEN HANSEN, OF FERSLEV, NEAR SKIBBY, DENMARK.

## STREAM-MOTOR.

No. 922,890. Specification of Letters Patent. Patented May 25, 1909.

Application filed March 26, 1907. Serial No. 364,587.

*To all whom it may concern:*

Be it known that I, PEDER JÖRGEN HANSEN, master carpenter, subject of Denmark, residing at Ferslev, near Skibby, in the Kingdom of Denmark, have invented certain new and useful Improvements in Stream-Motors, of which the following is a specification.

This invention relates to a stream motor, that is, a water wheel adapted to be placed in a water current to utilize the energy of the stream, so that it may drive one or more machines placed ashore.

The motor consists of a machine frame placed upon pontoons in the current and having bearings for two horizontal motor shafts, to each of which is fixed two chain wheels, around which is laid an endless chain whose joints are formed of paddles. The lower half of the chain lies in the stream, and the paddles are formed in such a manner, that they may be moved in either direction, dependent on the direction of the stream, thereby turning the chain wheels and their shafts at either side. The rotation of the shafts is by means of suitable transmissions transmitted to motor shafts placed ashore, from which the machine or the machines in question are moved. The stream motor is especially characterized thereby, that it rests upon a single sub-marine pontoon, which lies so deep in the water, that the waves can have no influence upon the stability of the motor, and by a smaller pontoon lying in the surface of the water above the first named pontoon and fixed to the frame of the motor; the little pontoon assists in bearing the motor, prevents spattering of water, and forms together with the sub-marine pontoon a channel, which is closed at the top and bottom and through which the paddles move; this channel may also be closed at the sides by means of wooden walls or the like placed between the pontoons.

The invention is illustrated in the accompanying drawings, in which,

Figure 1 is an elevation of the motor; Fig. 2 is a plan view of the same showing only some of the paddles; Fig. 3 is a diagrammatical section view, showing the connection between the stream motor and the machine ashore; Fig. 4 shows one of the transmissions between the shafts of the motor and the shaft of the motor placed ashore, and, Fig. 5 is a perspective view of the entire stream-motor.

It is assumed that the stream-motor is placed below a bridge and rests upon the submarine pontoon *a*, whose width corresponds to the distance between the piers or the sides of the current. The pontoon carries the motor frame *b* having at each end bearings *c* for two horizontal cross shafts *d*, *d*. The shafts are at each side of the frame provided with a chain-wheel or star-wheel *e* fixed to the shafts and around these two pairs of wheels is laid the endless chain formed of double paddles *f*, which are connected with each other by means of hinge bolts *g* having at their ends rollers *h*, which run upon upper and lower rails along the sides of the frame and engage in the recesses of the chain-wheels (see Figs. 1 and 5), so that the paddles will always travel at the same height.

The paddles or blades *f* are, by means of rigid stays 2 and triangular side-plates 1, connected to the hinge-bolts *g* (Figs. 1, 2 and 5) in such a manner that the middle of the blades always moves in the level of the rails upon which the rollers *h* run. By this arrangement the action of the blades or paddles is highly improved and all injurious stress upon the blades or paddles is avoided, as the stress always will be in the middle of the blades.

The pontoon *a* lies so deep in the water that the lower half of the chain is normally below the surface so that the stream will move the chain to either side and thereby rotate the chain-wheels *e* and shafts *d*. Between the two chain-wheels and above the lower parts of the chains the frame carries a lesser pontoon or air box *i* lying in the surface of the water. In Fig. 1 the sides of the channel formed by the pontoons are closed by means of boards or the like.

One end of the shafts *d* has a pinion, a toothed wheel or a chain-wheel from which the motion is transferred to the shafts *j* placed ashore; as shown in Fig. 3 the shafts *j* may be provided with a fixed and a loose belt-pulley, *k* and *l* respectively, so that a machine *m*, for instance a dynamo, may be driven by the shafts. Where the direction of the stream shifts, the arrangement may be selected in such a manner that the rotation is transmitted in opposite directions to the two shafts *j*, *j* (Fig. 1), the dynamo being then driven from either of these shafts according to the direction of the stream.

In order to direct the movements of the

motor, when the water is rising or falling, so that these movements may be vertical, guide rollers *o* and *p* run along two planes arranged at right angles to each other on the side walls of the piers or the current (Fig. 2) so that the up and down movements are accurately guided.

Where the height of the water is very variable, the transmission between the shaft *d* and *j* is preferably arranged as shown in Fig. 4, in which the end of the shaft *d* is provided with a conical pinion *r* intermeshing with another conical pinion *s*, placed in a swing-frame. Through the pinion *s* the transmission shaft *t* is carried in such a manner that it will be rotated together with the pinion, while at the same time the pinion can freely be moved up and down along the shaft. At the upper end the shaft *t* has bearings in another swing-frame and is rigidly connected with a conical pinion *u* intermeshing with a conical pinion *v* on the shaft *j*. By means of this device the transmission of the power from the shafts *d* to the shafts *j* will never be prevented by variations of the height of the water, and the transmission shaft will always regulate itself.

In order to lift the stream motor out of the water in case of drift of ice or of repair piston pipes or hydraulic hand-jacks *x* of known construction are provided at both sides. When moved in a known manner these hand-jacks will lift the motor, which may then be suspended into hooks *z* placed in the bridge beams (Fig. 3).

Having now described and ascertained the nature of my said invention and in what manner the same is to be performed I declare that what I claim is:

1. In a stream motor, the combination with a frame, chain wheels mounted upon horizontal shafts in said frame, and an endless chain surrounding said chain wheels and composed of paddles plunging into the water and moved thereby to cause the chain wheel shafts to rotate, of a single submarine pontoon carrying said frame and so charged that it lies so deep in the water that the waves cannot change the vertical position of the motor, and a small surface pontoon secured to the frame and lying in the surface of the water above the first named pontoon, said small pontoon assisting in bearing the motor, preventing spattering of water and forming together with the submarine pontoon a channel closed at the top and bottom through which channel the paddles move.

2. In a stream motor, the combination with a frame mounted upon a submarine pontoon, and chain wheels mounted upon horizontal shafts in said frame, of an endless chain surrounding said chain wheels and composed of paddles *f*, hinge-bolts *g*, rigid stays 2 and triangular side-plates 1, which latter connect the paddles to the hinge-bolts in such a manner that the stress acts upon the middle of said paddles when the chain moves through the water.

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

PEDER JÖRGEN HANSEN.

Witnesses:

MARCUS MOLLER,

HAROLD FROST.