

No. 703,997.

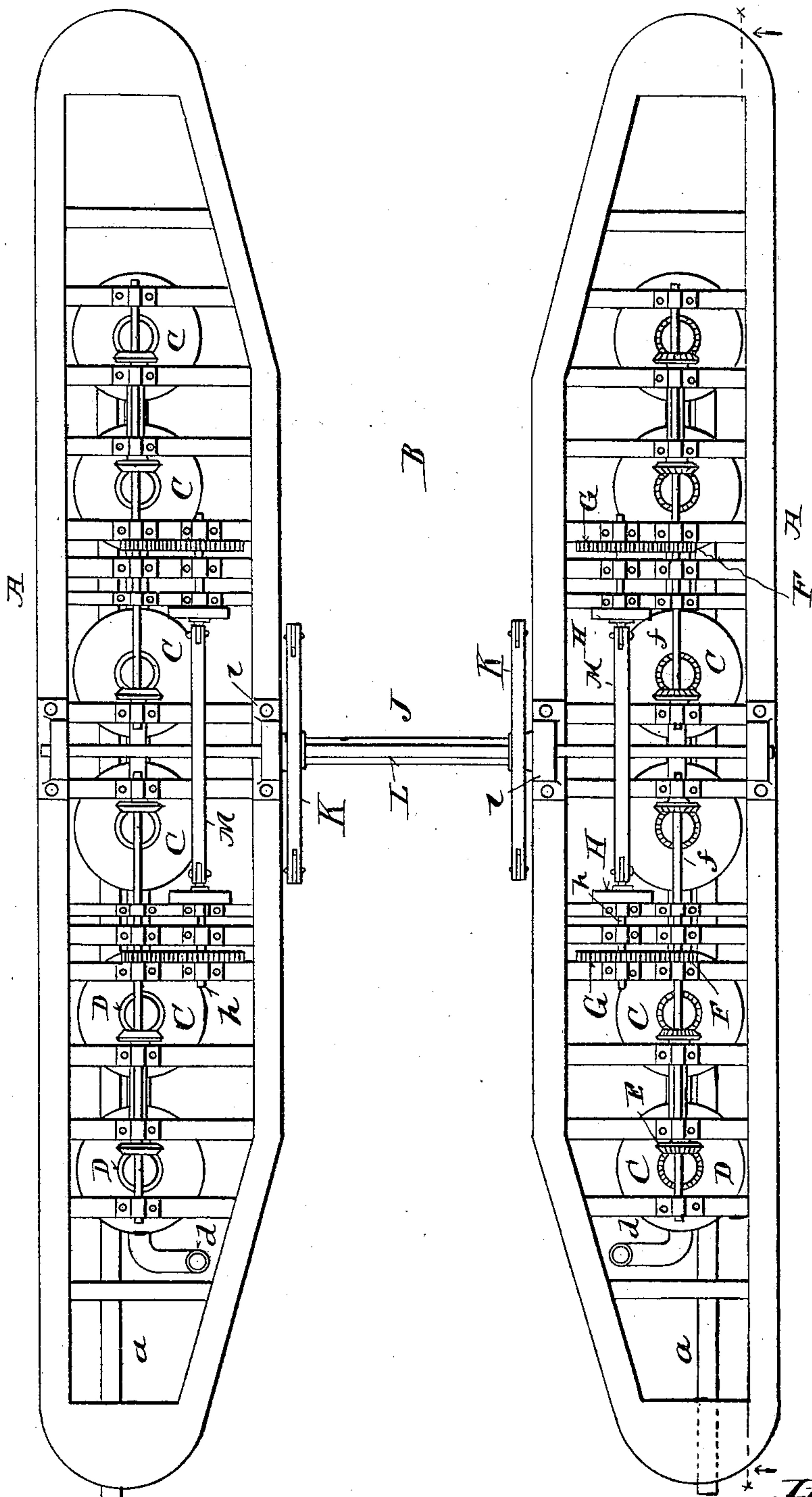
Patented July 8, 1902.

E. CHAQUETTE.
WAVE MOTION PUMP.

(Application filed Apr. 22, 1901.)

(No Model.)

3 Sheets—Sheet 1.



Witnesses:
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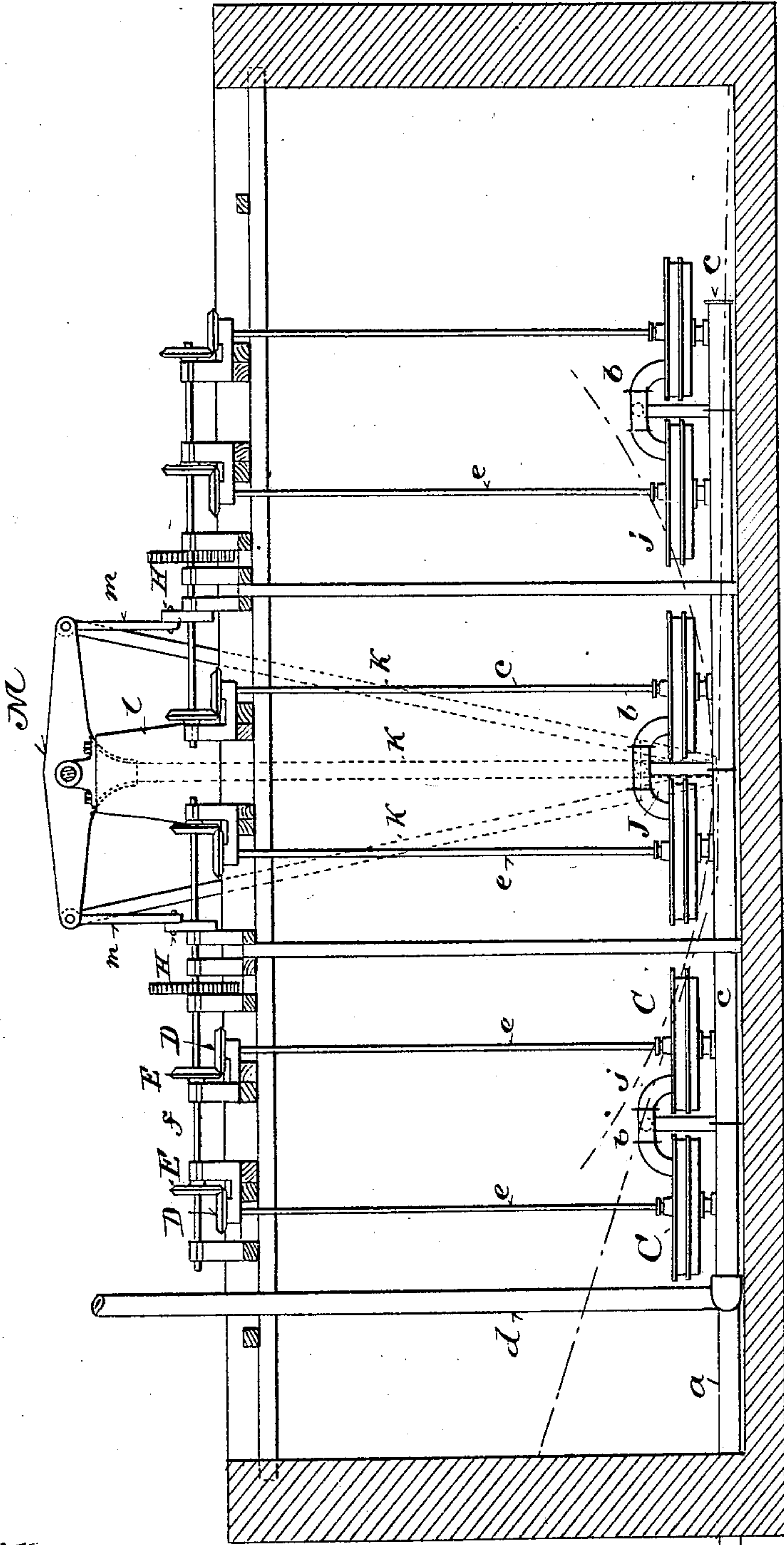


Fig. 2.

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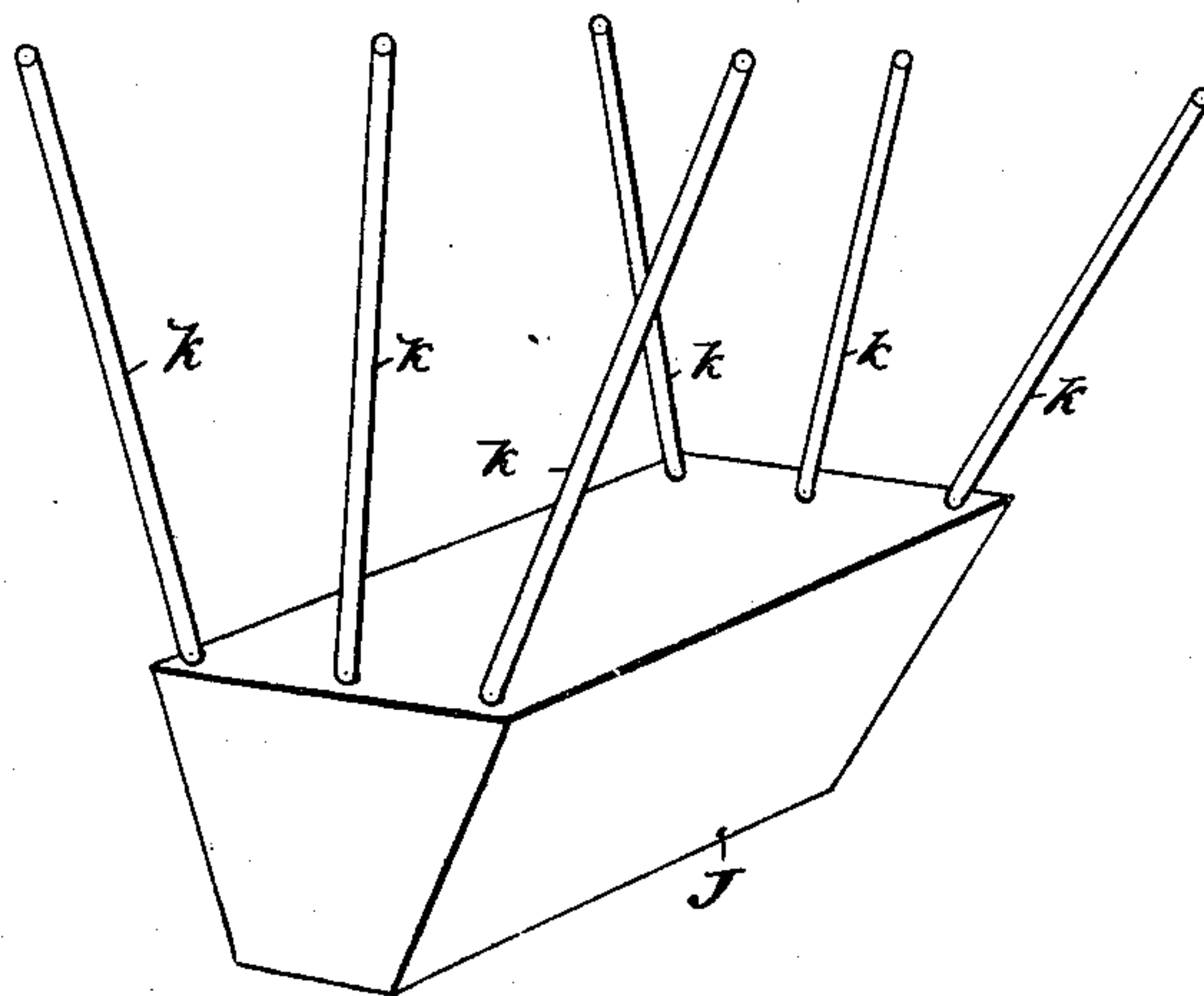


Fig. 3.

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UNITED STATES PATENT OFFICE.

EPHRAIEM CHAQUETTE, OF NEW ROCHELLE, NEW YORK.

WAVE-MOTION PUMP.

SPECIFICATION forming part of Letters Patent No. 703,997, dated July 8, 1902.

Application filed April 22, 1901. Serial No. 56,830. (No model.)

To all whom it may concern:

Be it known that I, EPHRAIEM CHAQUETTE, a citizen of the United States, and a resident of New Rochelle, county of Westchester, State of New York, have invented certain new and useful Improvements in Wave-Motion Pumps, of which the following is a specification.

The object of my invention is to provide a pumping system which shall be adapted to be operated by the action of surf along the sea-shore and by which the wave motion at any or all stages of the tide is transmitted into the continuous rotation of one or more shafts, by means of which water may be pumped from along the beach into a reservoir, where it is stored as a supply of power by means of which a motor or other mechanism may be driven, if desired.

For the sake of simplicity and clearness I have called this apparatus a "wave-motion pump" and shall describe it as such; but it is obvious that the character of work performed by the continuous rotation of the shaft may be very largely varied, while the important function of the apparatus is to take up the irregular and intermittent motion of the waves and convert it into such continuous rotation of the shaft. To accomplish this object, I construct two or more piers or bulk-heads, so as to form a waterway between them, the outer end, and preferably the inner also, being provided with a flaring mouth, so that as the water enters at either end under the action of the tide it is forced by the converging walls to rise, thus increasing its depth and the consequent impact force upon the surface of the pendulum, which I suspend in said waterway. The deflection of this pendulum is the first step in converting the wave motion into shaft rotation, which is accomplished by suitable mechanism, as hereinafter described.

My invention therefore consists in a wave-motion pump which consists of a waterway formed between suitable piers, a pendulum swinging therein, one or more pump-operating shafts, and suitable mechanical devices, whereby the motion of said pendulum is communicated to and caused to rotate said shafts.

One form of my invention is shown in the accompanying drawings, in which—

Figure 1 is a top plan. Fig. 2 is a vertical

longitudinal section. Fig. 3 is a detail of the pendulum.

Same letters indicate similar parts in the different drawings.

A A are the piers, and B is the waterway. The piers are preferably made of brickwork or other masonry, (see Fig. 2,) divided into suitable compartments and protected, if desired, by spiling. (Not shown.) Each pier contains a number of pumps C C, which pump water from along the beach by the pipe *a*. This pipe is branched, as shown at *b*, Fig. 2, so as to supply the pumps by pairs. Each pump communicates with the pipe *c*, from which the water is forced through the pipe *d* to a storage-reservoir (not shown) situated at any convenient distance. Each pump is turned by means of a vertical rod *e* from a beveled gear D, the rod or shaft *e* being journaled in proper supports. The gears D mesh with the beveled gear E, mounted upon the horizontal shaft *f*, journaled in the supporting-frame. These horizontal shafts *f* each carry a gear F, which engages with and is driven by the gear-wheel G, mounted upon the shaft *h*, which is also journaled in the supporting-frame and carries on its outer end an eccentric H, from which it derives its motion, as hereinafter explained.

The mechanism thus far described constitutes what I have called the "pumping system," the object of which is to draw water from the bay or ocean on the beach of which the apparatus is erected and discharge the same into a reservoir, from which it can be drawn as desired or in which it may be stored and used as a supply of power for driving a mill, motor, or other form of machinery. As before stated, the specific character of this pumping apparatus forms no part of my invention, nor is the fact that it is a pumping system material to the employment of my invention, because, as before explained, I have illustrated a pumping system merely to show one practical form of my improved apparatus, and any other form of machinery can be substituted in place of the pumping system, if desired.

The novelty of my invention consists in the means whereby I take up the motion of the water in the waterway B, whether the same is a to-and-fro motion or an intermittent mo-

tion in one direction, and convert this motion into the continuous rotation of the shafts h by the eccentrics H , as will now be explained.

J is a pendulum of considerable size and surface, preferably tapering, as shown in dotted lines in Fig. 2. This pendulum vibrates in the path j and is supported, preferably, by the rods k k from the center and from the outer ends of the arms K K , which are mounted on the cross-shaft L , journaled in the posts l of the supporting-frame. The cross-shaft L also carries the two walking-beams M , from each end of which hangs a driving-rod, in the lower end of which is attached to the eccentric H in the well-known manner, so that both the up and down motion of the rods serve to rotate the eccentric H in a given direction. Of course the connection of the rods m to the eccentrics H is such that both eccentrics rotate in the same direction, so as to insure uniform action on the part of all the pumps C .

Although described as an eccentric and drive rod, the connection between the walking-beams and the rotary shafts may be in the form of a rack and pinion or any other well-known mechanical device whereby a reciprocating motion is converted into a rotary motion.

As before stated, my improved wave-motion pump is intended for use at all stages of the tide and in all weathers. It is therefore preferably set so that the center of the waterway B always contains water. When used where the rise and fall of the tide is slight—for instance, two feet or less—the bottom of the pendulum may be set so as to remain slightly above the level surface of water at low tide and not require adjustment. Where, however, the difference between the high and low tide is great—for instance, eight or ten feet or more, or even less—the pendulum should be made adjustable in its height, so that by occasionally raising it on flood-tide or lowering it on ebb-tide the pendulum will never be too far buried by the rushing water to operate effectually.

This apparatus may be set, if desired, at the edge of the tide, so that the inrush of a wave swings the pendulum in one direction and the outrush in the reverse direction. Apparatus so situated, however, would only be useful during a small portion of the time, as there is no surface outrush after the water has obtained a certain depth. The appara-

tus is therefore preferably set so as to be operated only by the impact of the surf in its inrush, the incoming wave being piled up to considerable depth by the sides of the flaring mouth of the waterway and projecting itself against the pendulum swings it forward and passes underneath. The pendulum then falls back to make its return stroke under the influence of gravity.

It is obvious that each swing of the pendulum in either direction communicates the force received from the wave motion to the eccentrics H by means of the drive-rods m . The revolution of the eccentrics turns the shaft h , gears G , gears F , and shafts f . From these shafts through the beveled gears E and D motion is communicated to the vertical shafts e , which operate the pumps C , so that water is being constantly pumped through the pipe a and projected into the reservoir through the pipes c d as long as the pendulum swings.

As there is always more or less surf on the shore of the ocean, it is obvious that the apparatus can be so set as to be continuously operated, while by adjusting the height of the pendulum according to the violence of the surf the action of the apparatus can be rendered sufficiently uniform for practical purposes.

I claim—

1. A wave-motion pump which consists of a waterway formed between suitable piers, a shaft extending across said waterway, arms extending from said shaft longitudinally over said waterway, a pendulum suspended from said arms and adapted to swing in said waterway, a walking-beam mounted upon said shaft and means substantially as described whereby the reciprocating motion of the walking-beam is converted into a rotary motion and transmitted to the mechanism to be operated thereby.

2. In a wave-motion pump the above-described pendulum consisting of a tapering lower portion extending across the waterway and of rods suspending the same from the cross-arms of the rock-shaft of said pump, substantially as described for the purposes specified.

EPHRAIEM CHAQUETTE.

Witnesses:

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