June 5, 1956 S. W. SEARCY 2,749,085

OCEAN WAVE MOTORS

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Fig. 1.

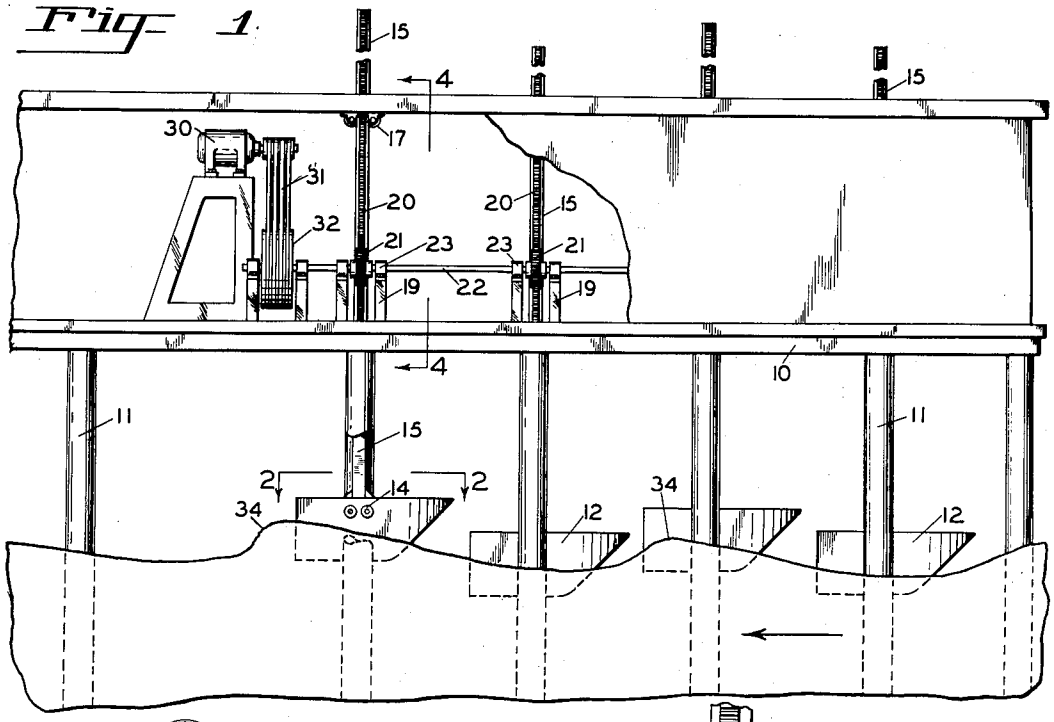


Fig. 2

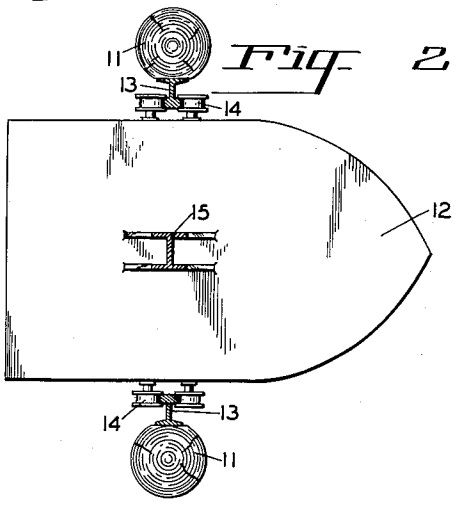
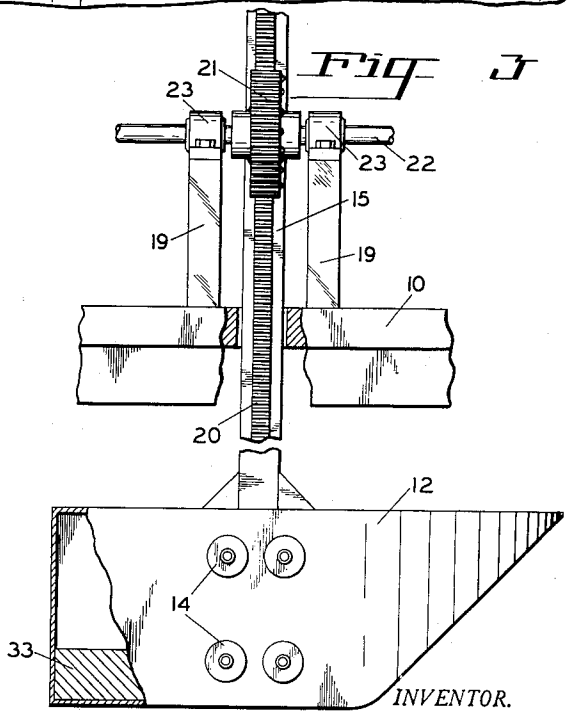


Fig. 3



INVENTOR.
SERAL W. SEARCY

BY Kimmel & Crowell

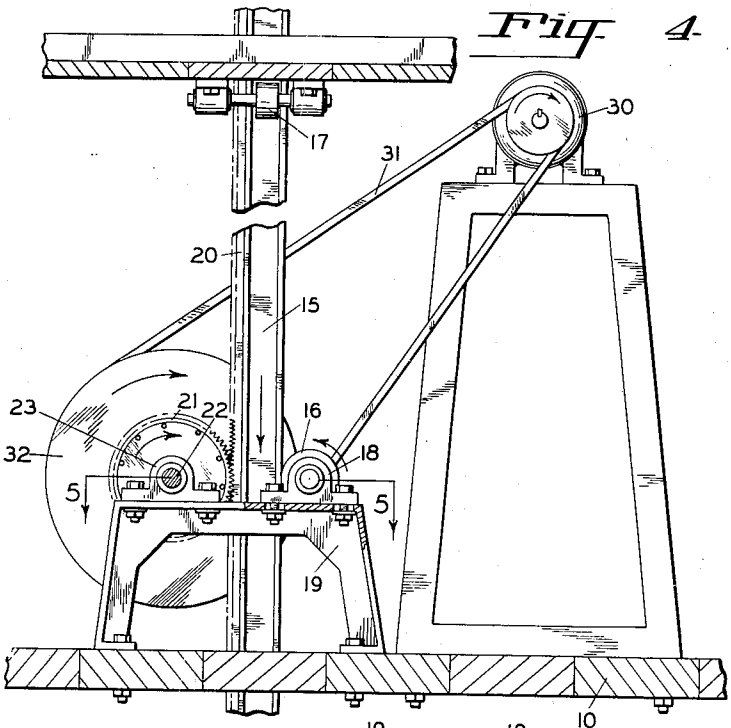
ATTORNEYS

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OCEAN WAVE MOTORS

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Fig. 4



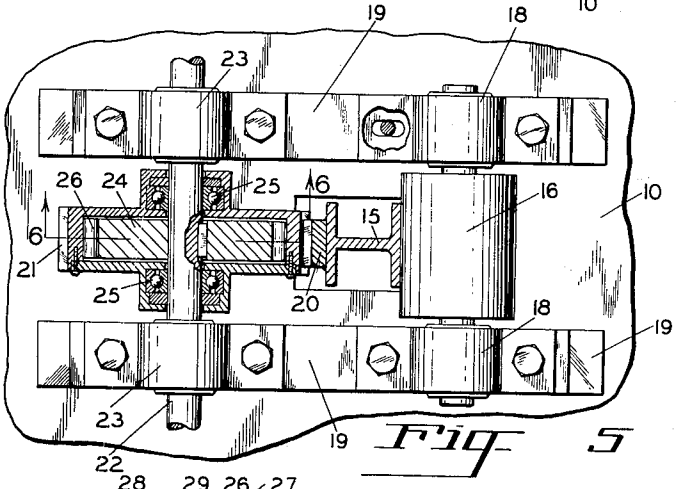


Fig. 5

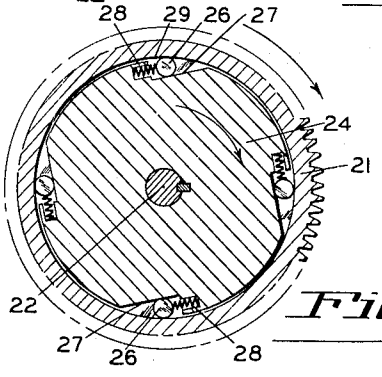


Fig. 6

INVENTOR.
SERAL W SEARCY
BY
Kimmel & Crowell
ATTORNEYS

United States Patent Office

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2,749,085

OCEAN WAVE MOTORS

Seral W. Searcy, Portland, Oreg.

Application January 19, 1955, Serial No. 482,697

4 Claims. (Cl. 253—10)

This invention relates to ocean wave motors and is particularly adapted for converting the power of the waves into electric energy and the like.

This application is related to my now pending application, Serial No. 386,915, Ocean Wave Air Compressor, filed October 19, 1953, now Patent No. 2,706,077.

The primary object of the invention is to convert power developed by the rise and fall of waves of the ocean into a power that will operate generators, developing electric power.

In order to carry this object out, pontoons are vertically disposed within suitable framework through which the waves of the ocean pass, raising and lowering the pontoons vertically within the framework. Gear racks are fixedly secured to the pontoons and operate in connection with an over-running gear assembly associated with a driven shaft for imparting rotation to the said shaft in one direction. This drive shaft operates electric generators or other energy developing equipment.

Other and further objects and advantages of this invention will become more apparent from a consideration of the following specification when read in conjunction with the annexed drawings, in which:

Figure 1 is a side view of a framework fixedly located over the ocean waves, having pontoons mounted therein, and the electric power developing machinery also mounted within the framework, parts broken away for convenience of illustration.

Figure 2 is a plan sectional view, taken on line 2—2 of Figure 1, looking down on a preferred form of pontoon structure.

Figure 3 is an enlarged fragmentary side view of a pontoon associated with my preferred form of gear rack mechanism, parts broken away for convenience of illustration.

Figure 4 is a sectional view, taken on line 4—4 of Figure 1, illustrating the gear rack assembly associated with an electric generator, parts broken away for convenience of illustration.

Figure 5 is an enlarged fragmentary view, taken on line 5—5 of Figure 4, of the gear rack assembly, partially broken away for convenience of illustration.

Figure 6 is a sectional view of the gear, illustrating an over-running clutch associated therewith.

Referring more specifically to the drawings:

A platform 10 is mounted upon piling 11, the piling 11 being driven into the bed of the ocean in the usual manner. Pontoons 12 operate between the piling, the pontoons being guided on vertical rails 13 by way of the trunnion wheels 14. Fixedly secured to the pontoons are vertical beams 15 which pass upwardly through the platform 10 and are guided vertically by the rollers 16 and 17. The rollers 16 are journalled within bearings 18, which are mounted to the base frame 19.

A gear rack 20 is fixedly secured to a side of the beam 15 by any suitable means, and is adapted to engage the gear 21, as best illustrated in Figures 3, 4 and 5. The gears 21 are rotatably mounted in one direction on the

horizontal shaft 22, and the shaft 22 is journalled within the bearings 23. The gears 21 are adapted to deliver rotating power to the shaft 22 in one direction, and to over-run the shaft in the opposite direction.

In order to accomplish this action, the gear is made up of two parts, a hub 24 is keyed to the shaft 22, while the gear itself revolves on the shaft by way of the bearings 25. The assembly is of a well known structure of an over-running clutch, consisting of rollers 26 operating on the inclined surfaces 27 of the hub 24. The springs 28 cause the roller to engage this surface, as well as the inner surface 27 of the gear 21, as best illustrated in Figure 6.

When the gear is rotated in the direction of the arrow, the rollers 26 grip the surfaces 27 and 29, rotating the hub 24 and the shaft 22. When the gear is turned in the opposite direction of the arrows the rollers 26 do not engage and grip the hub as above described, but allow the gear to turn and the shaft to continue in the direction of rotation imparted by the gear when travelling in the direction of the arrows. This will be more fully described later on.

The shaft 22 may drive any device attached thereto, for instance the electric generator 30, by way of the belts 31 and the driving sheave 32, or power may be taken from the shaft 22 by any other suitable means, or any form of driven device may be applied to the shaft.

The trunnion wheel 17 guides the beam 15 in a vertical line of travel. The trunnion wheel 16 also guides the beam and rack, holding the rack in contact with the gear 21. Other guide trunnions could be used in addition if found necessary.

Referring to the pontoons 12, these pontoons have a ballast 33 located therein, as best illustrated in Figure 3. When the waves 34 cause the pontoons to raise, the ballast 33 will assist in the lowering of the pontoons by the action of gravity. This action is what delivers power through the rack 20 to the gear 21, to the shaft 22 by way of the over-running clutch mechanism, therefore when the waves raise the pontoons the clutch mechanism over-runs freely. One of the objects of this invention is to cause rotation of the shaft by the action of gravity after the pontoons have been raised and are being lowered by gravity on the receding of the waves.

In the operation of this new and improved wave motor, the waves 34 pass through the piling 11 and the pontoons 12, the waves raising the pontoons, raising the beam 15 and the rack 20 therewith imparting a rotating motion by the rack to the gear 21. The gear, while being rotated by the rack in the raising of the pontoons, over-runs the driven shaft 22 by way of its over-running clutch assembly as above described.

When the waves pass from under the pontoons, the pontoons will be lowered by the ballast 33 and its own weight. The racks 20 will rotate the gears 21 in the direction of the arrow, Figure 6, causing rotation of the shaft 22. As there will be a series of pontoons, each pontoon as it is raised and lowered will impart rotation of the shaft 22, all of the pontoons working together to develop a rotating power to this shaft, which is delivered by way of the belts 31 to the generator 30.

Some of the pontoons will be rising and some will be lowering, but there will always be a rotating power to this shaft. The greater the number of pontoons employed, the more steady this power will be and the more power they will be delivering to the shaft.

Although a certain specific embodiment of the invention has been shown and described, it is obvious that many modifications thereof are possible. The invention, therefore, is not to be restricted except insofar as is necessitated by the prior art and by the spirit of the appended claims.

What is claimed is:

1. A power generating device comprising a platform fixedly supported in elevated position above a body of water having a vertically reciprocating movement relative thereto, said platform being secured to one end of spaced piling having their other respective ends embedded in the bed of said body of water, a shaft, bearing means mounted on a support and rotatably supporting said shaft on said platform, gearing including an over-riding clutch therefor mounted on said shaft, a gear rack extending through and on opposite sides of said platform, said gear rack comprising an I-beam having gear teeth projecting from an edge thereof with said teeth meshing with said gearing, a roller mounted on said support and engaging the other edge of said I-beam to hold said gear rack teeth in mesh with said gearing, rollers engaging opposite sides of the web of said I-beam to prevent lateral movement thereof, a float disposed in said water and reciprocating therewith, said rack having the depending end thereof fixedly secured to said float for reciprocation therewith, said clutch being out upon upward movement of said float and in upon downward movement thereof to impart rotary movement to said shaft, and a power take-off device secured to said shaft for rotation therewith.

2. A power generating device as defined in claim 1, and a guide rail fixedly secured to each adjacent pair of piles in confronting relation, and a pair of trunnion rollers mounted on a pair of opposite sides of said floats and engaging said guide rails whereby said float reciprocates vertically between said pair of piles.

3. A power generating device as defined in claim 2, said floats being substantially hollow, and each of said floats having a weight disposed therein.

4. The invention as set forth in claim 1, wherein said float comprises a pontoon containing ballast to assist in lowering said pontoon by gravity action.

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