

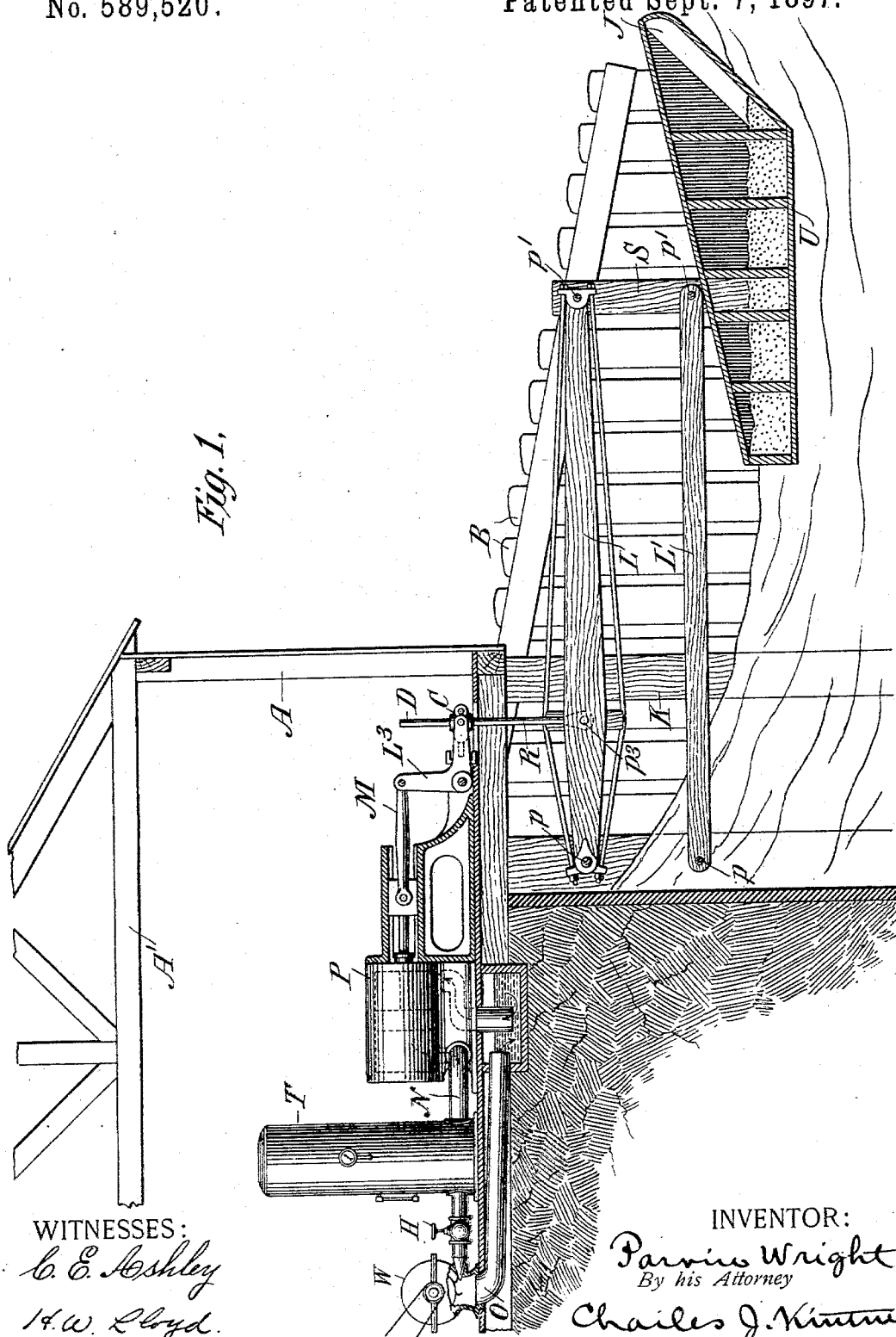
(No Model.)

3 Sheets—Sheet 1.

P. WRIGHT.
WAVE MOTOR.

No. 589,520.

Patented Sept. 7, 1897.



WITNESSES:

C. E. Ashley

H. W. Lloyd.

INVENTOR:

Parvin Wright
By his Attorney

Charles J. Kintner

(No Model.)

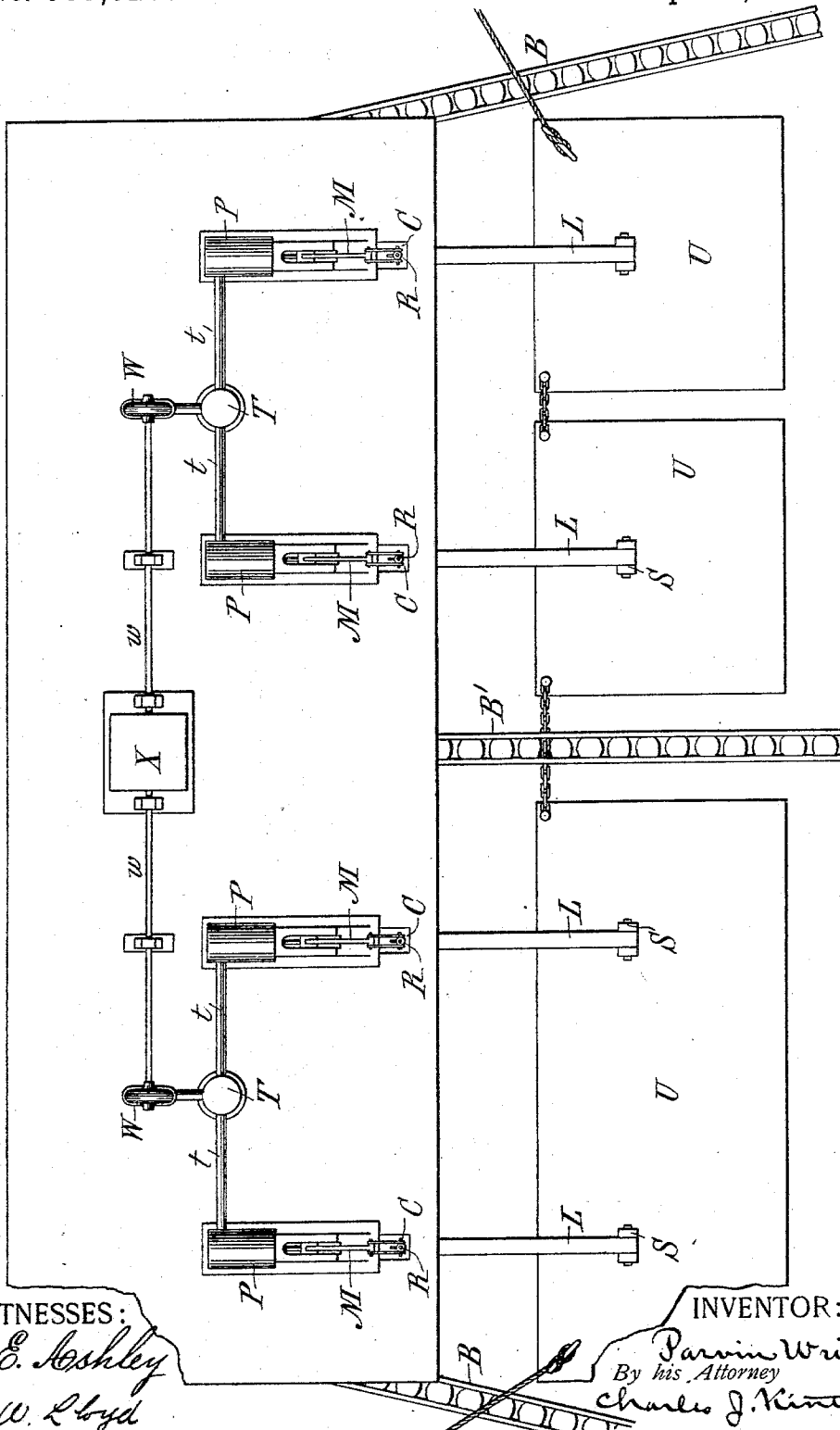
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Fig. 2.



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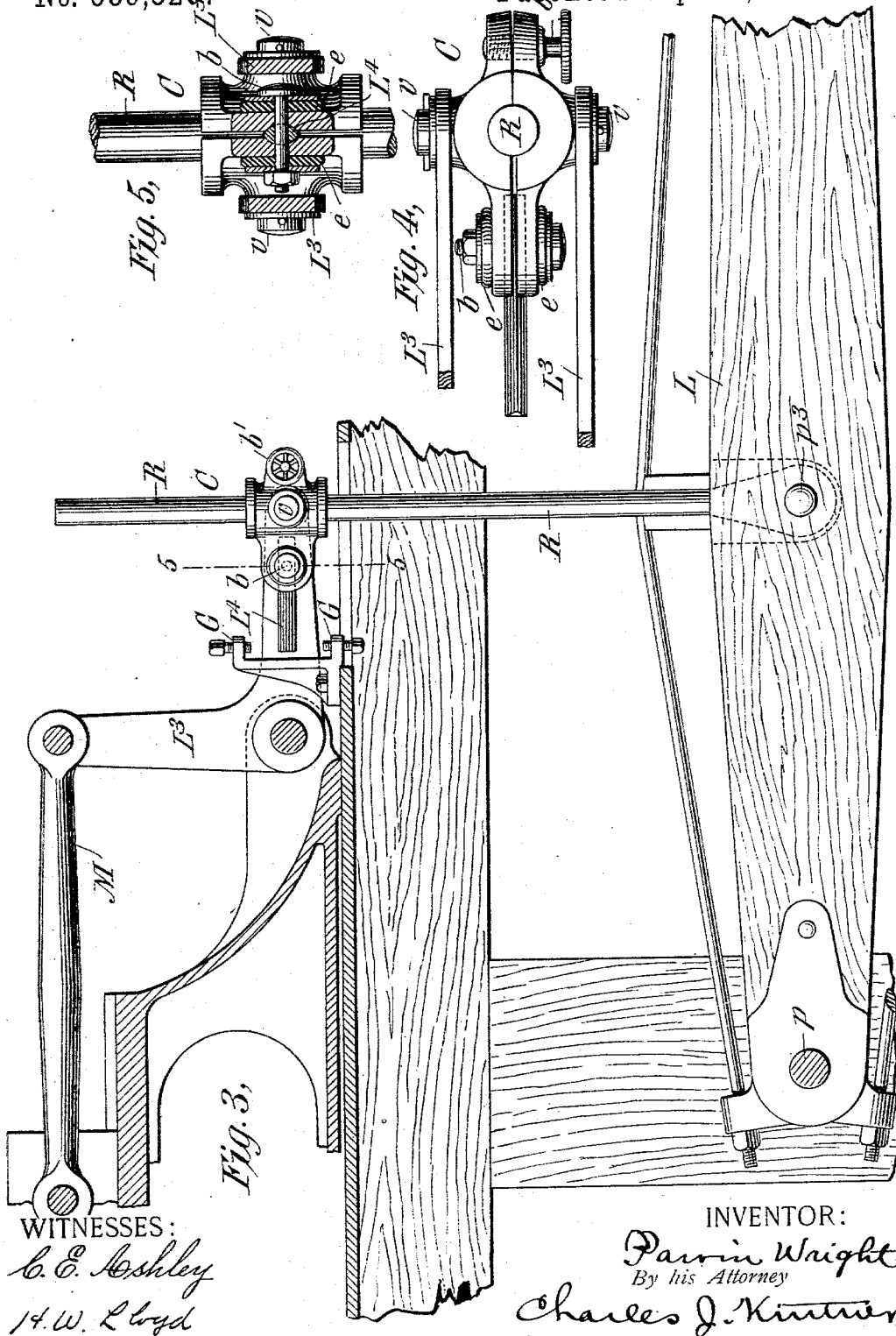
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UNITED STATES PATENT OFFICE.

PARVIN WRIGHT, OF KESWICK, CALIFORNIA.

WAVE-MOTOR.

SPECIFICATION forming part of Letters Patent No. 589,520, dated September 7, 1897.

Application filed May 11, 1896. Serial No. 591,087. (No model.)

To all whom it may concern:

Be it known that I, PARVIN WRIGHT, a citizen of the United States, residing at Keswick, in the county of Shasta and State of California, have made a new and useful Invention in Wave-Motors, of which the following is a specification.

My invention is directed particularly to improvements in that type of wave-motors in which a float is utilized by rising and falling with the waves; and its objects are, first, to so construct and arrange such a float that it will transmit power from the waves to pumping mechanism in such manner as to utilize the force of the waves in one direction and the weight of the float only in the other to the best possible advantage; second, to so connect the float or floats of such a wave-motor to the pumping mechanism that the stroke of the pump will be constant for all positions of said float or floats in rising and falling; third, to connect a float through one or more pairs of levers with a source of power-transmitting mechanism and power-storing mechanism and to combine the same with a motor device or motor designed to utilize the power stored. I accomplish these objects by the wave-motor and mechanism hereinafter described, the essentially novel features of my invention being particularly pointed out in the claims at the end of this specification.

My invention will be fully understood by referring to the accompanying drawings, in which—

Figure 1 is a part sectional part elevational view illustrating my improved wave-motor as operatively connected to pumping mechanism, which in turn is operatively connected through a pressure-tank with means for driving the well-known form of Pelton water-wheel. Fig. 2 is a plan view of a plant illustrating a series of my improved wave-motors operatively connected to pumping mechanism and Pelton water-wheels, which in turn are geared to a dynamo-electric machine. Fig. 3 is a detail part sectional part elevational view of my improved means for operatively connecting a wave-motor with a pump in such manner that the piston of the pump will always be given the same stroke in each direction no matter what the height or fall of the wave may be. Fig. 4 is a detail plan view of

said connecting mechanism; and Fig. 5 is a sectional elevational view of the same as taken on the line 5 5, Fig. 3, and as seen looking from the left toward the right-hand side of the drawing upon that figure.

Referring now to the drawings in detail, and first to Figs. 1 and 2, A A' represent the framework of a power-house secured upon piles K K at the shore and adapted to protect or cover the pumping mechanism, consisting of a pump P, having the usual piston-head operatively connected by a piston-rod M with two bell-crank levers L³ L³, secured in the usual way to the framework or floor of the power-house. (See Figs. 3 and 4.) The pump P is connected by a pipe N with a pressure tank or chamber T, provided with well-known forms of water-level and pressure gages, and said tank is in turn connected with a pipe provided with a nozzle located in alinement with the buckets of the well-known form of Pelton water-wheel W, the flow of water from said nozzle being regulated by a hand-valve H.

O is a return-pipe located beneath the water-wheel and adapted to carry the water from said wheel to a stationary supply-chamber beneath the pump P, a pipe being provided in said supply-chamber for conveying water therefrom to the pump P, as indicated by the arrows.

B B are side walls composed of piles driven in alinement with each other and supported at their tops by stringers, the arrangement of said side walls being substantially as shown in Fig. 2, B' being a central wall where two or more of my wave-motors are operatively connected together.

L L' are levers pivoted in pairs at p p at points beneath the power-house and pivoted in turn at their outer ends at p' p' to uprights S S, rigidly secured near the opposite ends of a float U, which float is so constructed as to be of great strength and with its outer lower face J presenting an angular front to the incoming waves, while its upper face is inclined inward toward the shore for all heights of the tide for the purpose of conveying away any water which dashes over it. This float is partially filled with sand and is pivotally connected by one or more pairs of levers to a stationary support and in such manner as to maintain the upper surface thereof always at

an angle to the level of the sea for all conditions of tide and wind, so as to always present to incoming waves the same angle of action against the outer lower inclined face.

5 In other words, the float will always assume the position shown in Fig. 1 of the drawings for all conditions of tide and wind, so that the standards S S will always remain vertical and the upper surface will always instantly
10 shed any water which may actually be dashed over the outer edge, the object being to always present the same angular face to incoming waves and afford a constant uplifting force therefrom on the upward movement of
15 the float, and likewise to afford always a constant downward force acting vertically in the line of the standards S S on the return of the float to its lower position. This feature of
20 I regard as very material in the maintaining of constant action for all conditions of tide and wind. These pivoted levers L L' are adapted to rise and fall between pairs of guiding-piles K K, which prevent any endwise
25 movement of the floats, said piles K K, as before indicated, constituting also a support for the power-house. At a point p^3 between the ends of each of the levers L is pivotally secured a rod R, which extends upward through
30 the floor of the power-house and is connected to the bell-crank levers L³ L³ by means of an automatically-adjustable mechanism shown in detail in Figs. 3, 4, and 5 for so regulating
35 the application of the power transmitted to the piston-rod M during the upward and downward movements of the float that said piston-rod will always be given the same amount of movement in either direction for all conditions of tide and waves. I will now
40 describe this improved connecting mechanism by referring especially to Figs. 3, 4, and 5 of the drawings.

C represents a two-part sleeve or clutch pivotally secured at $v v$ to the outer ends of
45 the bell-crank levers L³ L³, which in turn are secured to the piston-rod M, as already described. This two-part sleeve or clutch C is provided on one side with an adjustable hand-operated uniting-bolt b' and on the other with
50 a second uniting bolt and nut b , which bolt and nut not only hold the parts of the clutch together, but are adapted to simultaneously grip between the inner jaws of the clutch a yielding arm L⁴, the end inner of which extends
55 into the path of two adjustable screw-stops G G, carried by a bracket secured to the frame which supports the bell-crank levers L³ L³.

$e e$ are elastic or yielding washers secured
60 also by the bolt and nut b against the outer faces of the two parts of the clutch, the arrangement of all of said parts being such that when the apparatus is in the position shown in Fig. 3 the clutch firmly grips the
65 rod R and permits said rod to impart motion in either direction to the bell-crank levers L³ L³.

It will be observed upon examination of Fig. 5 that the yielding arm L⁴ is pivotally secured by the bolt b between the inwardly-
70 extending edges of the split sleeve or clamp C and is of elliptical shape in cross-section, and that when it is in its central position in corresponding elliptical grooves in the inner
75 faces of said inwardly-extending edges, as shown in Fig. 3, the parts of the clamp or split sleeve C will firmly grasp or hold the rod R, owing to the expansive action of the
80 yielding washers $e e$. This automatic clamp or split sleeve C is rendered readily adjustable by means of the hand-operated uniting-bolt b' , the inner adjoining faces of the parts united by said bolt being of curvilinear form,
as shown in Fig. 4.

The operation of my invention is as follows:
85 When the apparatus is connected up in the manner shown in Fig. 1, each time the float U is lifted by an incoming wave the pivoted levers L L' impart to the rod R an upward
90 motion, carrying with it the split sleeve or clamp C, which sleeve or clamp so long as it remains in the position shown in Fig. 3 will impart motion to the bell-crank levers L³ L³,
thereby imparting an inward motion to the piston-rod M, and hence to the piston-head
95 of the pump P, thereby forcing water from the supply-tank, as indicated by the arrows, through the pipe M into the pressure tank or chamber T. The length of the yielding arm L⁴ is such that at the time that the piston-
100 head of the pump P approximately reaches its extreme stroke the free end of said yielding arm L⁴ comes into mechanical contact with the adjustable stop G, thereby causing
105 said yielding arm to tilt about its point of support, the bolt b , and simultaneously to exercise a wedge-like action upon the inner extending edges of the split sleeve or clamp C against the pressure of the elastic or yielding
110 washers $e e$. This wedging action is sufficient to release the split sleeve or clutch from the rod R and allow it (the rod R) to continue on its upward course if the wave be
115 of abnormal height, thereby leaving the clutch to slide upon the rod until said rod returns with the downward movement of the wave. As soon as this occurs the split sleeve
or clutch immediately grasps the rod R, and consequently a downward motion is imparted
120 to the outer ends of the bell-crank levers L³ L³, and the piston-rod M is now returned in a reverse direction until the free end of the yielding arm L⁴ comes into mechanical contact on its downward movement with the
125 lower adjustable stop G, when the split sleeve or clamp is again released from the rod R in the same manner as before and said rod allowed to move downward to the extreme lower limit of the float and wave. On the
130 upward motion of the float the power is imparted to the pump by the lifting action solely of the wave, while on the downward motion the return action of the pump is imparted solely by the weight of the loaded float of

the peculiar construction shown, the arrangement being such that the action of said float is constant for all kinds of waves. In other words, I depend for the forward action of the pump upon the lifting power of the incoming wave alone and the reverse action thereof solely upon the weight of the float itself, there being no counteraction due to any wave which may break over it. This feature I consider as of great value in view of the fact that the mechanism is always subjected to the same strains under all conditions of wave and tide.

It will be noticed that owing to the automatic adjustability of the split sleeve or clamp C it always remains at such points of active or operative connection with the rod R as to give to the piston M a complete stroke in each direction for all conditions of tide and waves. This feature of automatic adjustability in the connections between a wave-motor and the source of power actuated thereby when combined with my novel form of float I regard also as of great importance, and my claims in this particular are generic.

In Fig. 2 of the drawings I have shown the application of my improved wave-motor to a series of floats U U U, united together by chains and sustained at their extreme ends by guy-ropes, said floats being in turn connected one to two sets of actuating-levers L L' and each of the others to single pairs of levers L L', but all connected to pumps P P P through the agency of my improved split sleeves or clutches and to two pressure tanks or chambers T T, which are in turn adapted to actuate two Pelton water-wheels W W, said Pelton wheels being in turn geared through shafting w to a dynamo-electric machine X or to any preferred means for utilizing the power thus transmitted—such, for instance, as mechanism for lifting water, compressing air, or in fact any of the well-known means of storing energy.

No claim is made in the present application to a wave-motor system provided with a number of floats having independent movement and each operatively connected with a pump, in combination with a compression-chamber operatively connected with all of said pumps, said compression-chamber being connected in turn to a water-motor, whereby the united action of all of the pumps is caused to give a continuous and steady flow of water to the water-motor, as this feature is claimed by me in a separate application filed by me in the United States Patent Office on the 28th day of July, 1897, and bearing Serial No. 646,173; nor do I claim herein mechanism for regulating the application of power from a variable-speed motor consisting of a pump operatively connected to said motor and a compression-chamber connected to said pump, in combination with a water-motor operatively connected to said compression-chamber, as this feature constitutes the subject-matter of a separate application filed by me in the United

States Patent Office on the 2d day of July, 1897, and bearing Serial No. 643,219.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. In a wave-motor a float provided with an inclined top surface and an inclined outer bottom face, said float being pivotally connected to one or more stationary points of support in such manner that it maintains its top surface at a constant inclination for all conditions of tide and wind, substantially as described.

2. In a wave-motor a float having an inclined outer face adapted to receive the force of incoming waves and an inclined top surface adapted to shed any overflowing water, in combination with one or more vertical standards secured by one or more pairs of pivoted levers to a stationary point of support and in such manner that the vertical standards remain always vertical and the inclined face always inclined for all conditions of tide and wind.

3. A wave-motor provided with an inclined face for receiving the force of incoming waves, said motor being pivotally secured to a stationary point of support in such manner that the aforesaid inclined face presents the same angle of inclination to the waves for all conditions of tide and wind, substantially as described.

4. A wave-motor consisting of a float having a horizontally-disposed bottom, an outer lower inclined face which maintains an angular relation to incoming waves, an upper inwardly-inclined surface adapted to shed any overflowing water, in combination with one or more vertical standards pivotally secured by one or more pairs of levers to a stationary point of support, and means for connecting said levers to a source of power, the arrangement being such that the vertical standards remain vertical for all conditions of wind and tide, and the inclined face and surface offer always constant angles of inclination to the incoming waves and overflowing water, substantially as described.

5. A wave-motor consisting of a float having an inclined face for receiving the force of incoming waves and an inclined top surface for shedding any overflowing water; one or more vertical standards pivotally connected through one or more pairs of levers to a stationary point of support, in combination with power-transmitting mechanism and interconnecting clutching mechanism adapted to act constantly upon the power-transmitting mechanism under all conditions of tide and waves, substantially as described.

6. A wave-motor consisting of a float pivotally secured to one or more pairs of levers pivoted to a stationary support, in combination with a pivoted rod or rods attached to said levers and clutching mechanism attached to a source of power-transmission, said clutching mechanism being provided with means

for automatically giving to the source of power constant action under all conditions of tide and waves.

7. A wave-motor consisting of a float pivotally secured by one or more pairs of levers L and L' to a stationary point of support, mechanism connecting said levers to a power-transmitting mechanism as a pump, power-storing mechanism, such as a pressure-tank, connected to said pump, in combination with a Pelton water-wheel operatively connected with the pressure-tank, substantially as described.

8. A system of power-transmission consisting of a float having an inclined outer face adapted to receive the force of incoming waves, an inclined top surface adapted to shed overflowing water, one or more pairs of levers pivotally connecting said float with a stationary point of support, mechanism connecting said levers with a pump, a pressure-tank operatively connected with said pump, and a water-wheel operatively connected with said pressure-tank, substantially as described.

9. In a system of power-transmission a float having an inclined face adapted to receive the force of incoming waves, an inclined top surface adapted to shed the overflow of such waves, one or more pairs of pivoted levers operatively connecting said float with a stationary point of support and in such manner as to maintain its angular relations constant with relation to the surface of the sea; mechanism operatively connecting said levers with a power-transmission as a pump, power-storing mechanism in the nature of a pressure-tank operatively connected with said pump, and a source of water-supply, in combination with a Pelton water-wheel and circulating-pipes between the water-wheel, the source of water-supply, and the pressure-tank, substantially as described.

In testimony whereof I have hereunto subscribed my name this 1st day of April, 1896.

PARVIN WRIGHT.

Witnesses:

C. WRIGHT,

RUBY WRIGHT.