R. ROUNTREE.

WAVE MOTOR.

APPLICATION FILED OCT. 12, 1914.

1,227,201.

Patented May 22, 1917.

6 SHEETS—SHEET 1.

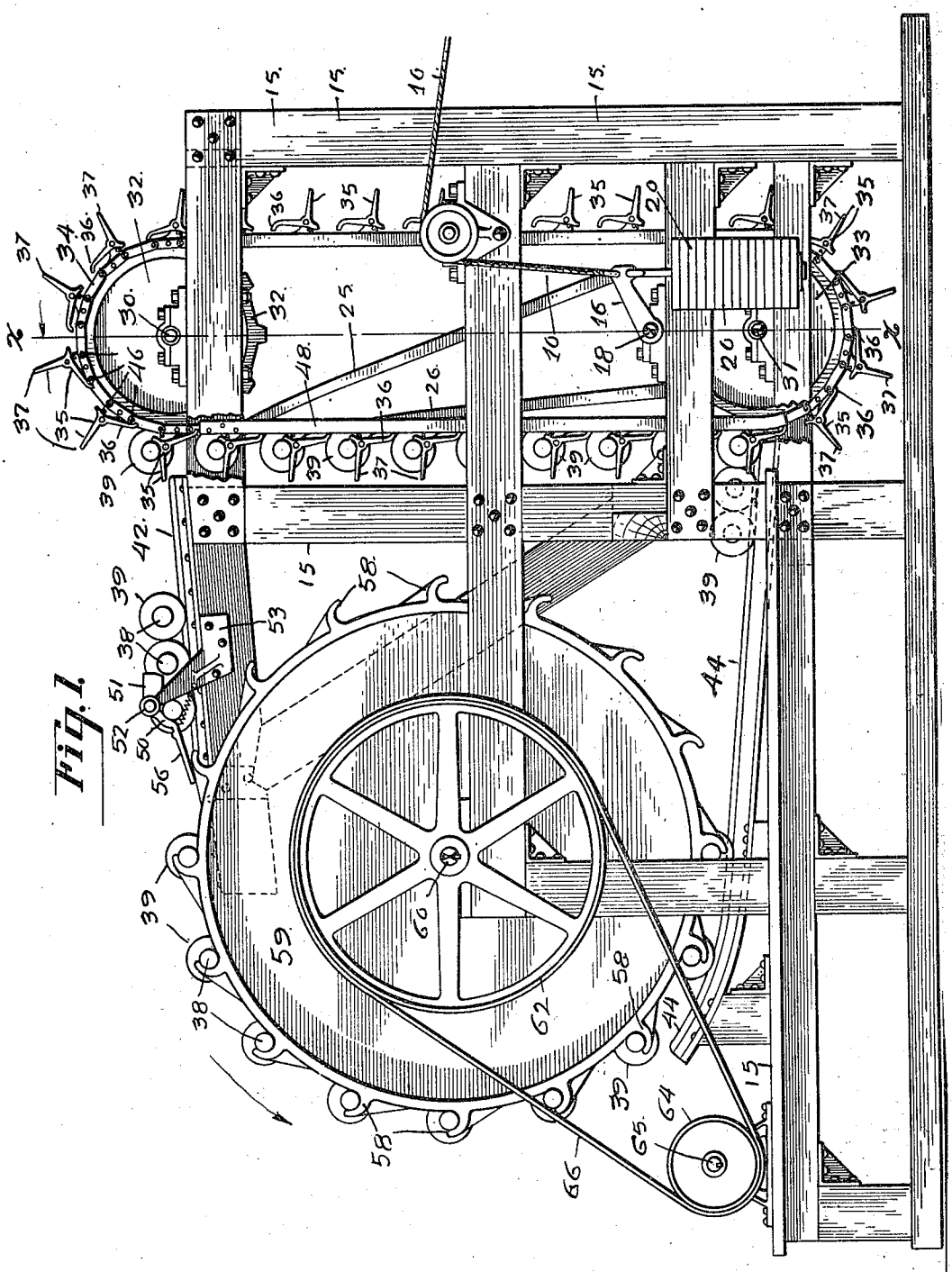


Fig. 1.

Witnesses

George Kenney.

Earl F. Schultz.

Inventor

Richard Rountree

By Arthur L. Sles.

His Atty.

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6 SHEETS—SHEET 2.

Fig. 4.

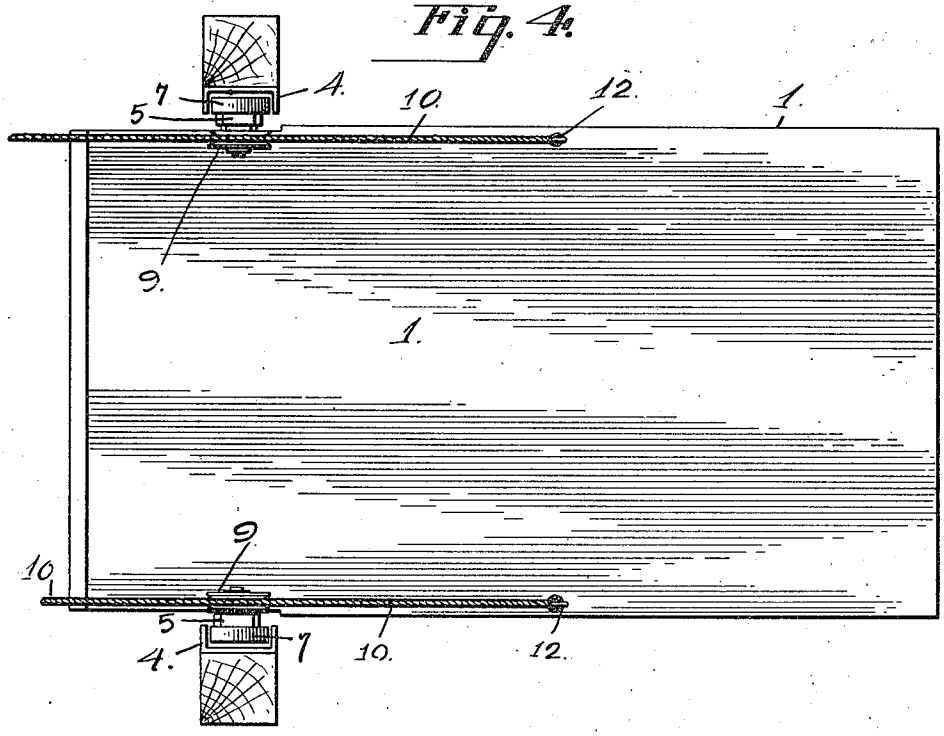


Fig. 2.

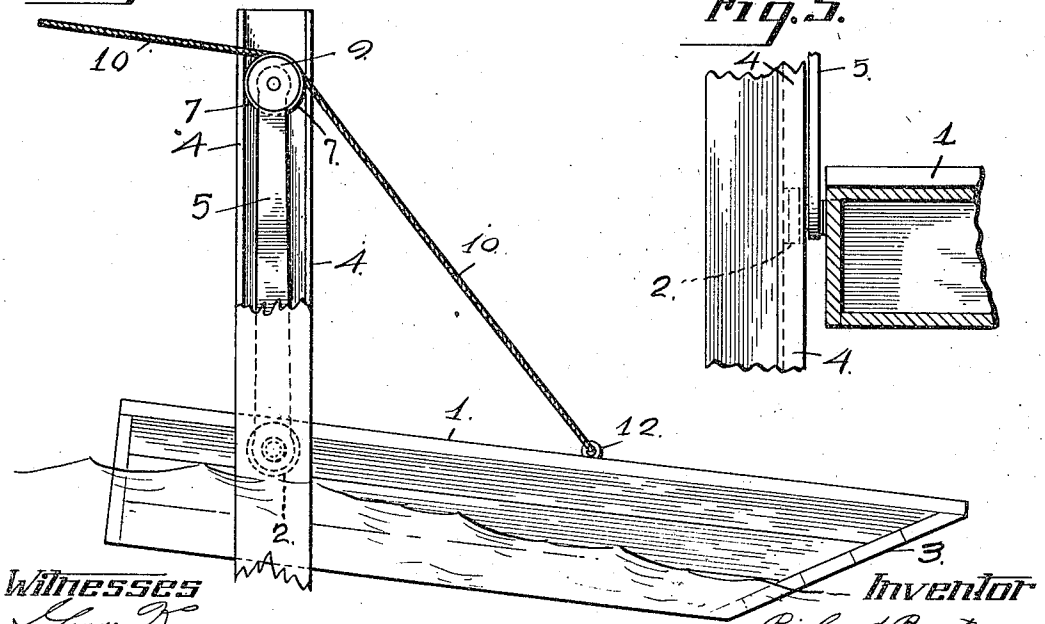


Fig. 5.

Witnesses

George Kromrey

Paul F. Schultz

Inventor

Richard Rountree

By Arthur L. Slee

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6 SHEETS—SHEET 3.

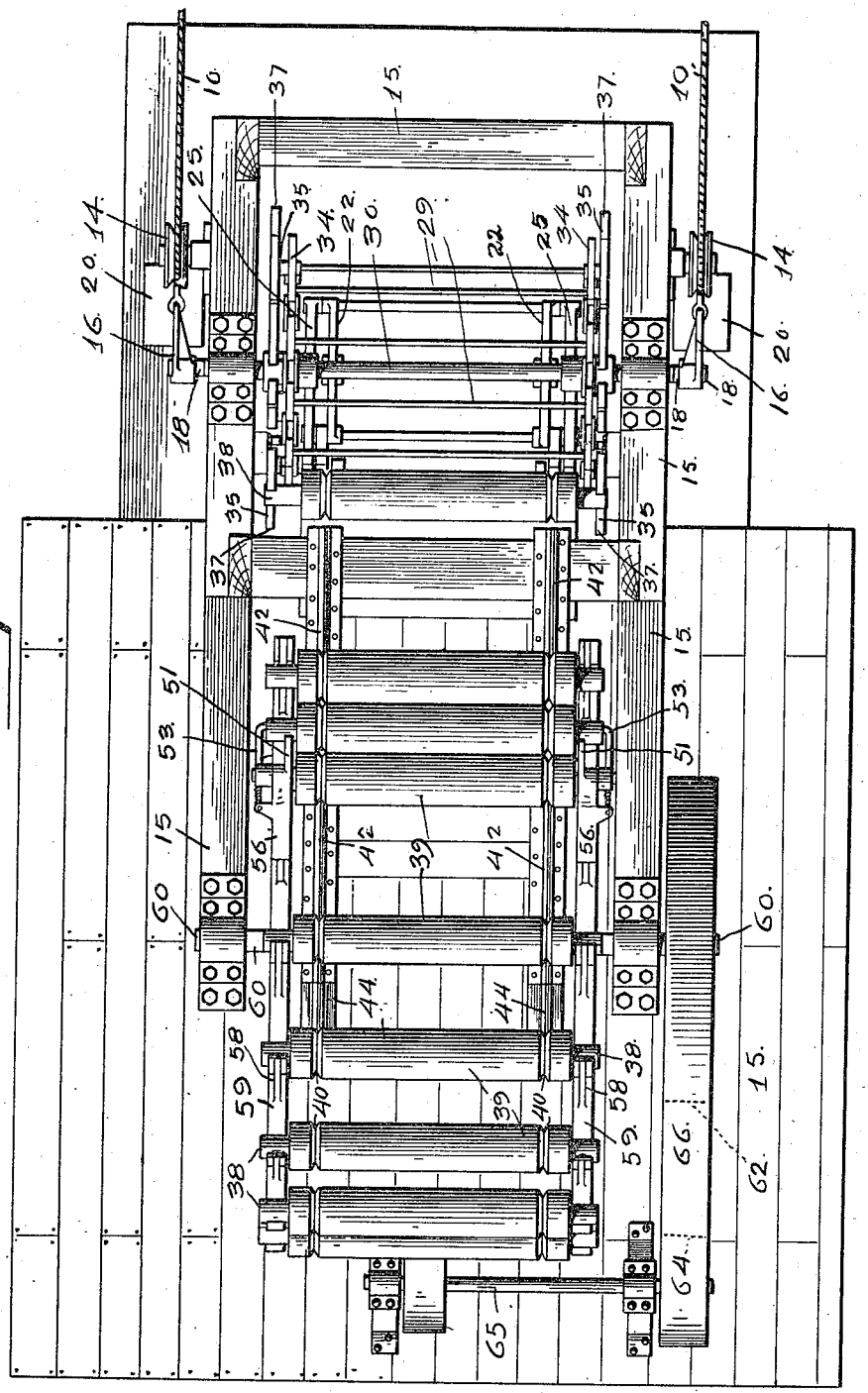


Fig. 3.

Witnesses

George Kenney.

Paul F. Schultz.

Inventor

Richard Rountree.

By Arthur P. Sles

His Atty.

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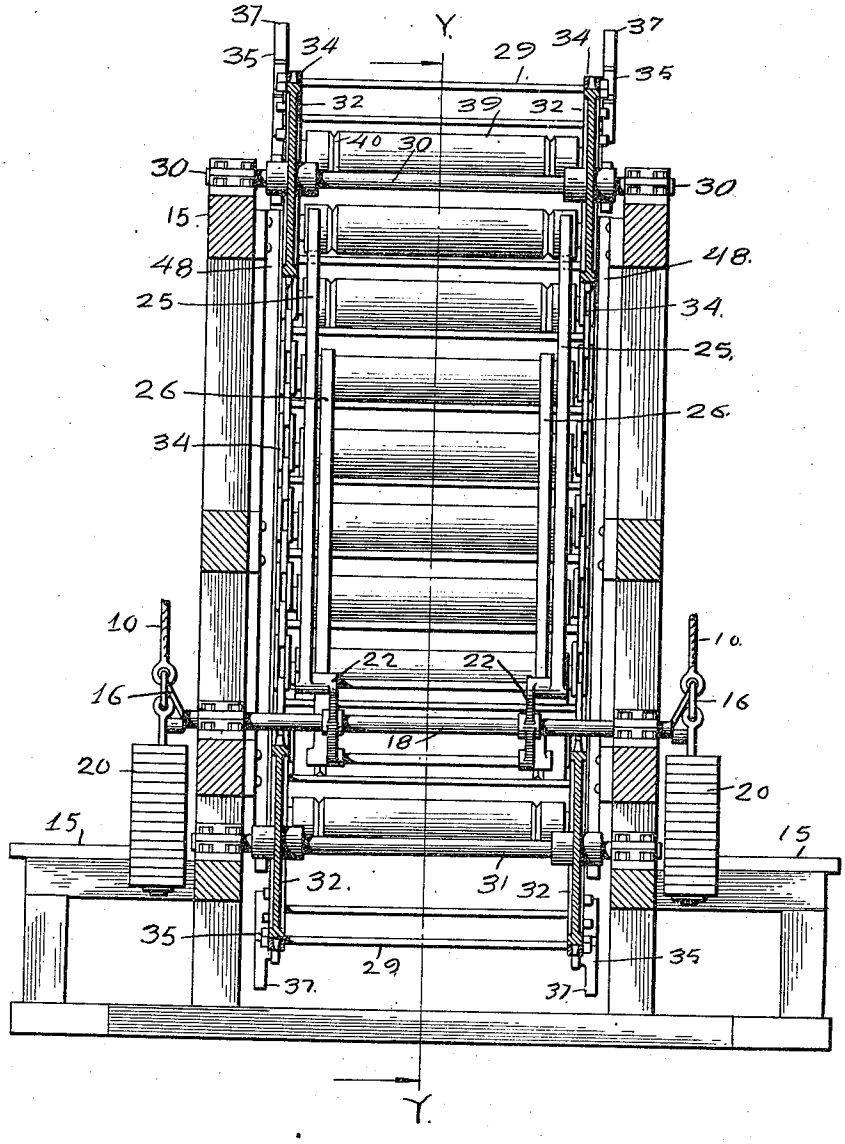
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6 SHEETS—SHEET 4.

Fig. 6.



Witnesses

George Kenney.

Karl F. Schultz.

Inventor

Richard Rountree

By Arthur L. Slee.

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6 SHEETS—SHEET 5.

Fig. 7.

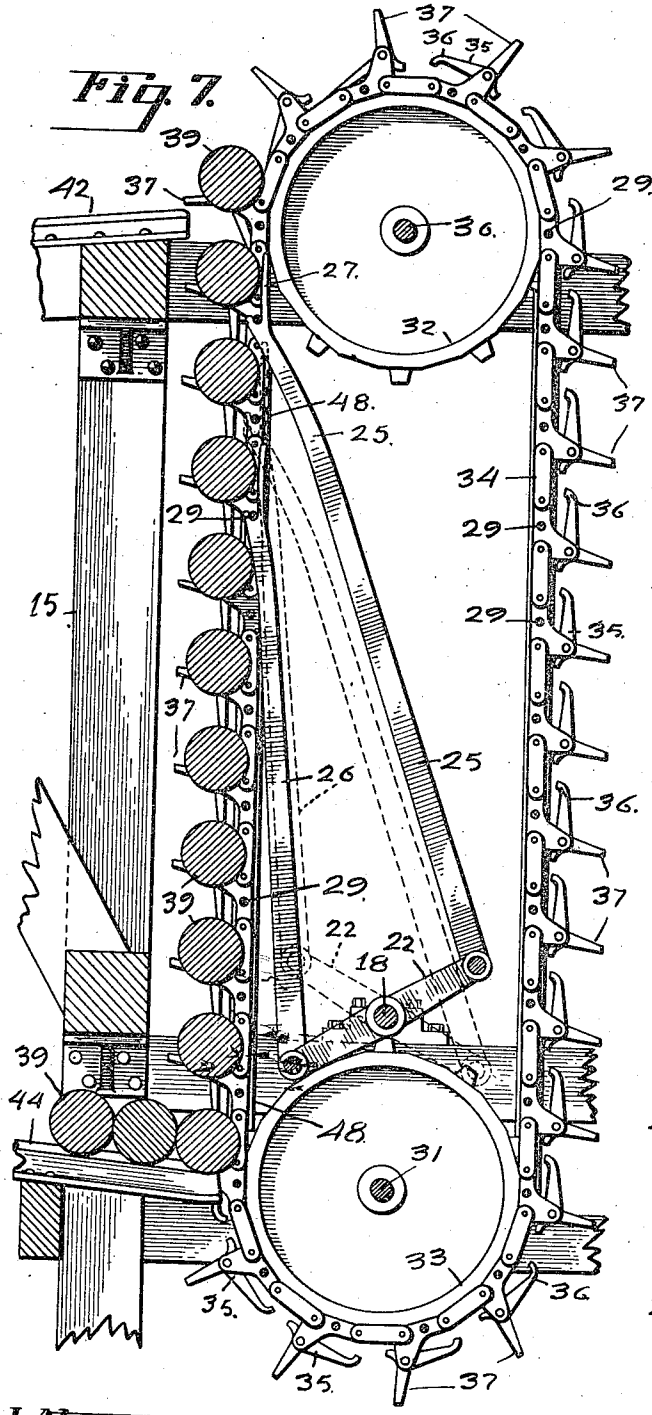


Fig. 8.

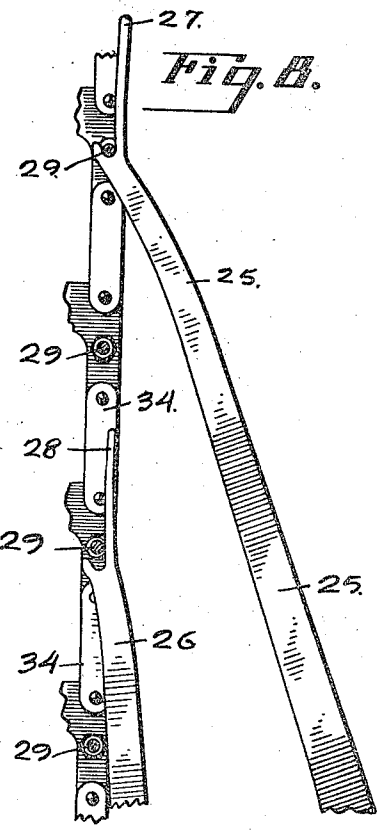
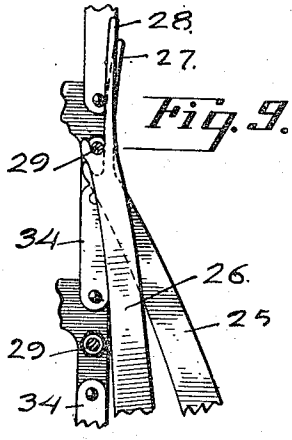


Fig. 9.



Witnesses

George Kenney.

Paul F. Schmidt

Inventor

Richard Rountree

By Arthur L. Shee.

His Atty.

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6 SHEETS—SHEET 6.

Fig. 12.

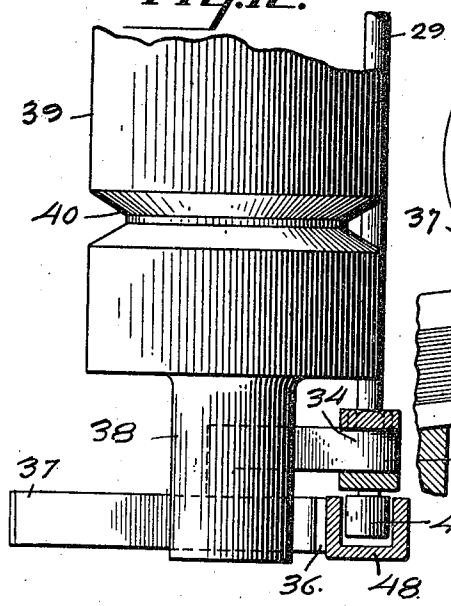


Fig. 11.

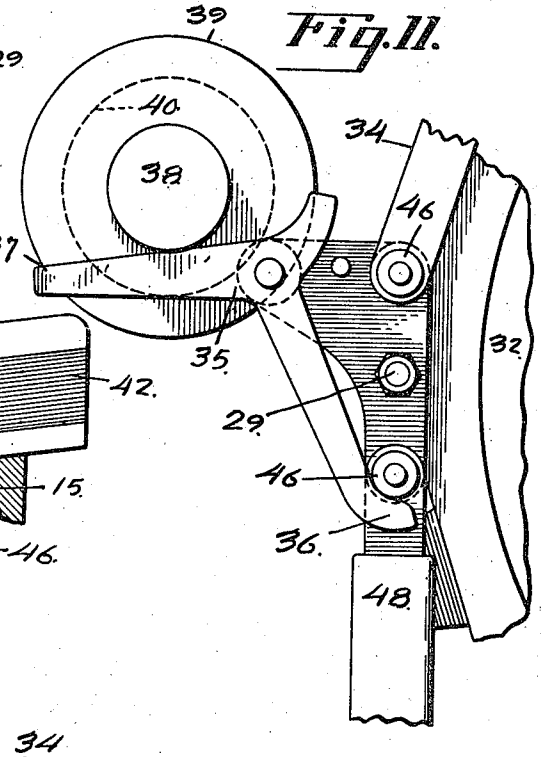


Fig. 10.

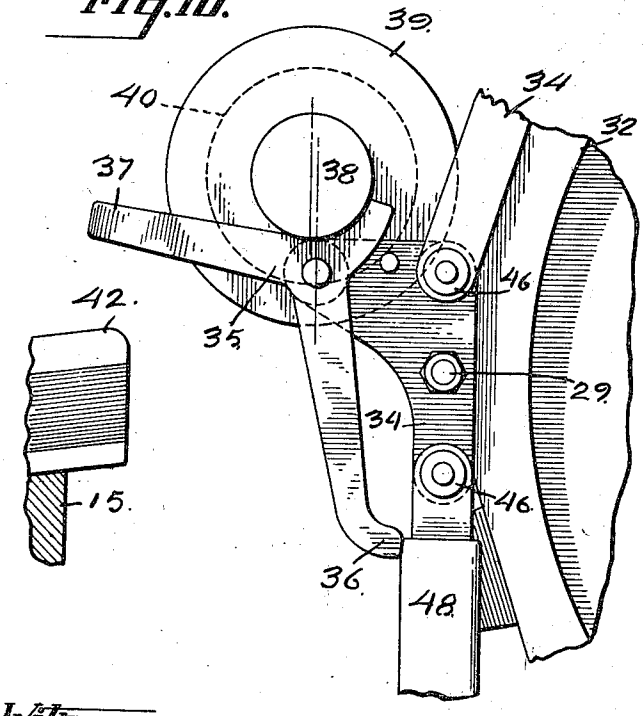
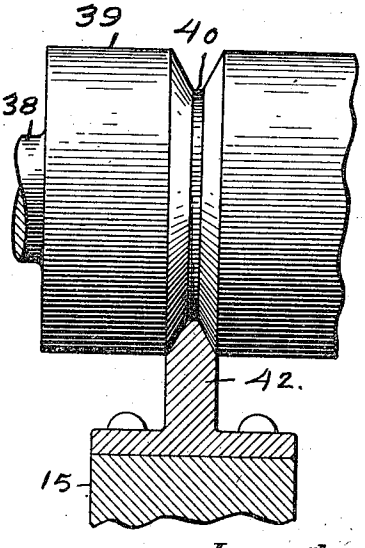


Fig. 13.



Witnesses

George Kromrey

Paul F. Schmidt

Inventor

Richard Rountree

By Arthur L. Slee.

His Atty.

UNITED STATES PATENT OFFICE.

RICHARD ROUNTREE, OF SAN FRANCISCO, CALIFORNIA.

WAVE-MOTOR.

1,227,201. Specification of Letters Patent. Patented May 22, 1917.

Application filed October 12, 1914. Serial No. 866,396.

To all whom it may concern:

Be it known that I, RICHARD ROUNTREE, a citizen of the United States, and a resident of the city and county of San Francisco and State of California, have invented a new and useful Improvement in Wave-Motors, of which the following is a specification.

My invention relates to wave motors, wherein a float, operated by the movement of the waves, imparts an intermittent movement to a conveyer, which in turn raises weights to an incline above a wheel having pockets on the periphery thereof, the said weights in turn rotating a wheel; and the objects of my invention are, first, to provide improved means for transforming the reciprocating movement of the waves into a continuous rotary movement, by means of which power may be generated; second, to provide means whereby weights are received from a lower incline below a power wheel and carried to an incline above the power wheel; third, to provide means which will operate independently of the float, for the purpose of assisting in the raising of the weights to an upper incline; fourth, to provide improved means for transferring a reciprocating movement of a float to a conveyer; fifth, to provide improved means for retaining weights on a conveyer; and sixth, to provide improved means for automatically releasing the weights from the conveyer and conveying them onto an upper incline.

I accomplish these several features by means of the device disclosed in the drawings forming a part of the present specification, wherein like characters of reference are used to designate similar parts throughout the said specification and drawings, and in which—

Figure 1 is a broken side elevation of the conveyer, disclosing the manner in which the conveyer is operated by a cable and also the manner in which the weights are conveyed from the lower incline to the upper incline and delivered onto the wheel.

Fig. 2 is a broken side elevation of the float, disclosing the manner in which the said float is slidably and pivotally mounted to the stationary piles and the manner in which the cable is operated, which in turn operates the endless conveyer, said Fig. 2 being substantially a continuation of the side elevation disclosed in Fig. 1 of the drawings.

Fig. 3 is a plan view of Fig. 1, disclosing cables on each side of the conveyer and the weights on the upper incline from the conveyer to the wheel.

Fig. 4 is a plan view of the float, disclosing the manner in which the said float is pivotally and slidably secured to stationary piles, said Fig. 4 being substantially a continuation of the plan view of Fig. 3 of the drawings.

Fig. 5 is a broken detailed view of one side of the float and one of the stationary piles, disclosing the manner in which the cable supporting pulley is connected to the float.

Fig. 6 is a sectional view taken on line X—X of Fig. 1 of the drawings in the direction indicated by the arrow.

Fig. 7 is an enlarged sectional view taken on line Y—Y of Fig. 6 of the drawings in the direction indicated by the arrow.

Fig. 8 is a broken detailed view of the operating levers in one extreme position and Fig. 9 is a similar view of the operating levers, excepting that the said levers are shown in the opposite extreme position.

Fig. 10 is a broken detailed view on an enlarged scale of the bell-crank levers secured to the chains of the endless conveyer, by means of which the weights are retained on the conveyer while said weights are being elevated.

Fig. 11 is a view similar to Fig. 10, but disclosing the bell-crank levers in the act of delivering a weight onto the upper incline.

Fig. 12 is a broken detailed plan view of Fig. 10; and

Fig. 13 is a broken sectional view of one end of the weights, disclosing the manner in which one of the grooves therein engages a track of either the upper or lower incline.

Referring to the drawings, the numeral 1 is used to designate a float pivotally and slidably mounted by means of rollers 2 thereon within parallel vertical channels 4 secured to stationary piles. Pivotally secured on the axis of the rollers 2 and on each side of the float are upwardly extend-

ing standards 5, also slidably mounted within the channels 4 by means of rollers 7 thereon.

On the upper ends of the upwardly extending standards 5 are rotatably mounted grooved pulleys 9, over which pass parallel cables 10 having one end thereof secured to the float 1, as at 12. The other ends of the cables 10 pass over rollers 14 rotatably mounted upon a suitable frame-work 15 at a suitable distance from the float 1. After passing over the pulleys 14, the inner ends of the cables 10 are secured to levers 16 on the ends of a shaft 18, pivotally mounted upon the frame-work 15.

Counter-weights 20 are secured just below the ends of the cables 10 to the levers 16. To the shaft 18 are rigidly secured beams 22 and to the ends of the beams 22 are secured operating bars 25 and 26, the said operating bars 25 and 26 being bifurcated at the upper ends, one of the said bifurcations on each set of bars being considerably extended, as at 27 and 28, respectively.

Also mounted within the frame-work 15 are the upper and lower shafts 30 and 31, said shafts having secured thereto suitable sprockets 32 and 33. Engaging both the sprockets 32 and 33 is a suitable endless conveyer 34, having pivotally mounted thereon bell-crank levers 35, the lower ends of which are inwardly turned, as at 36. The extensions 37 of the bell-crank levers 35 are arranged to support the reduced ends 38 of weights 39 having grooves 40 thereon arranged to engage the tracks 42 of the upper incline and similar tracks 44 of the lower incline.

The endless conveyer 34 is provided with suitable rollers 46 at regular intervals, said rollers being arranged to be engaged by a suitable channel 48 for the purpose of retaining those links of the endless conveyer 34 to which are pivoted the bell-crank levers 35 in a suitable supporting position on that side of the endless conveyer 34, which raises the weights 39.

The upper incline carries the weights 39 to a stop 50, which is pivotally secured, as at 52, to a bracket 53. A lever 56 is formed integral with the stop 50 and is arranged in the path of pockets 58 secured to a wheel 59, which is in turn rigidly secured to a shaft 60, rotatably mounted within the frame 15.

To the shaft 60 is also rigidly secured a pulley 62, which drives a pulley 64 on a shaft 65 by means of a suitable belt 66, said shaft 65 being rotatably mounted in suitable bearings secured to the frame 15.

The counter-weights 20, secured to the ends of the levers 16 on the shaft 18, are greater in weight than all of the weights 39, which are being raised by the endless conveyer 34, while the float 1 is greater in weight than the combined weight of the counter-weights 20 and the weights 39, which are being supported on the bell-crank levers 35 of the conveyer 34.

The operation is as follows:

A wave moving toward the float engages the inclined portion 3 thereof and raises the said float, thereby allowing the cables 10 to slack and lower the counter-weights 20. Inasmuch as the counter-weights 20 are greater in weight than all of the weights 39, being raised on one side of the conveyer, the said counter-weights 20, by means of the lever 16 and shaft 18, will operate the beams 22 and cause the parallel operating bars 26 to move upward and the bifurcated ends to engage the connecting rods 29 between the parallel chains of the endless conveyer 34 and move that side of the endless conveyer 34, containing the weights 39, upward.

At the same time, the parallel operating bars 25 on the opposite ends of the beams 22 will move downward until the parallel operating bars 25 and 26 assume the position disclosed in Fig. 9 of the drawings.

As the wave passes the float 1, and the outer end thereof returns to the hollow between the waves, the said float will pull on the cables 10 and raise the counter-weights 20, thereby reversing the movement of the beams 22 so that the parallel operating bars 25 will move upward and the bifurcated ends thereof will engage the connecting rods 29, resting upon the bifurcated portion of the parallel operating rods 26 and again move that side of the endless conveyer 34, on which the weights 39 are mounted, upward until the parallel operating rods 25 and 26 assume the position disclosed in Fig. 8 of the drawings.

The extended portions 27 and 28 of the rods 25 and 26, respectively are extended so as to facilitate the engagement of the upper ends of the rods 25 and 26 with the connecting rods 29.

As the crest of the wave passes the front end of the float 1 and reaches the point directly below the pivoted point of the said float 1, and assumes practically the position illustrated in Fig. 2 of the drawings, it is evident that as the rear end of the float is raised it will in turn raise the upwardly extending standards 5, pivotally secured thereto, and, by means of the grooved rollers 9 on the upper ends of the said standards 5, will raise the cables 10 and thereby exert a further pull upon the said cables 10.

Inasmuch as the float 1 is greater in weight than the counter-weights 20 and weights 39, it is obvious that as it falls between the waves it will readily lift the counter-weights 20 and the weights 39 on the endless conveyer 34. The weights 39 are retained upon the end-

less conveyer 34 by means of the extensions 37 of the bell-crank levers 35, which are pivotally mounted upon the said conveyer 34, by means of the inwardly turned portions 36 on the lower ends of the bell-crank levers 35, said portions 36 being arranged to engage and slide on the channels 48 in which that side of the endless conveyer 34 rides so as to retain the extensions 37 of the bell-crank levers 35 in such an inclined position that the weights 39 thereon will tend to roll, by gravity, toward the endless conveyer 34 and away from the free ends of the said extensions 37, until a weight 39 is slightly above the tracks 42 of the upper incline, when the extensions 36 of the bell-crank levers 35 will clear the upper ends of the channels 48 and the weight of the weights 39 will cause the levers 37 to drop a short distance and deliver the weights 39 onto the tracks 42 of the upper incline (see Fig. 11), the said tracks 42 engaging the grooves 40 of the said weights 39.

The weights 39 roll down the tracks 42 of the upper incline until they are engaged by the stop 50. As each pocket 58 of the wheel 59 engages the arm 56 of the stop 50, it will raise the said arm 56 and release one of the weights 39. Simultaneously, the extension 51 of the stop 50 will be lowered and engage the reduced portion 38 of the second weight 39 and prevent the same from rolling down the tracks 42 of the upper incline until the wheel 59 has rotated a sufficient distance to remove the pocket 58 from under the extension 56 of the stop 50, when a suitable spring, shown in Fig. 1 of the drawings, will return the stop 50 to a position where it will be in the path of the reduced portion 38 of the next weight 39 and at the same time will raise the extension 51 of the stop 50 and remove the same from in front of the said reduced portion 38 of the said next weight 39, thereby allowing the said weight 39 to roll down the tracks 42 of the upper incline, until the said reduced portion 38 is arrested by the stop 50.

The weights 39 thus loaded onto the wheel 59 will cause the said wheel 59 to move in the direction indicated by the curved arrow in Fig. 1 of the drawings, thereby rotating the shaft 60 and the pulley 62 thereon and imparting a continuous rotary movement, by means of the belt 66, to the pulley 64 mounted upon the shaft 65.

As the weights 39 in the pockets 58 reach the lowermost portion of the periphery of the wheel 59, the said weights 39 are delivered onto a lower incline 44, which incline 44 will deliver the weights to the lower portion of the endless conveyer 34, where they are again engaged by the extensions 37 of the bell-crank levers 35 and raised intermittently by the movement of the float 1 to the upper incline 42.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is—

1. A wave motor comprising a suitable frame-work; a wheel having pockets on the periphery thereof and rotatably mounted within the frame-work; a series of weights adapted to engage the pockets; an upper incline arranged to deliver weights to the top of the wheel and into the pockets thereon; an endless conveyer adapted to convey weights to the upper incline; a lower incline arranged to convey weights from the bottom of the wheel to the bottom of the conveyer; suitable bell-cranks pivotally mounted upon the endless conveyer and adapted to convey the weights on the said conveyer and to deliver the same to the upper incline; a shaft rotatably mounted within the frame-work; parallel beams secured to the shaft; a pair of parallel operating levers pivotally mounted upon the ends of the beams, said operating levers being arranged to engage the endless conveyer and move that side of the said conveyer containing the weights upward when the said arms move upward and to release the said conveyer when the said arms move downward; and a suitable float operatively connected to the shaft and adapted to be operated by the action of waves and to move one pair of operating arms and the weight side of the endless conveyer upward when the said float is lowered by the action of waves.

2. A wave motor comprising a suitable frame-work; a wheel having pockets on the periphery thereof and rotatably mounted within the frame-work; a series of weights adapted to engage the pockets; an upper incline arranged to deliver weights to the top of the wheel and into the pockets thereon; an endless conveyer adapted to convey weights to the upper incline; a lower incline arranged to convey weights from the bottom of the wheel to the bottom of the conveyer; suitable bell-cranks pivotally mounted upon the endless conveyer and adapted to convey the weights on the said conveyer and to deliver the same to the upper incline; a shaft rotatably mounted within the frame-work; parallel beams secured to the shaft; a pair of parallel operating levers pivotally mounted upon the ends of the beams, said operating levers being arranged to engage the endless conveyer and move that side of the said conveyer containing the weights upward when the said arms move upward and to release the said conveyer when the said arms move downward; a suitable float operatively connected to the shaft and adapted to be operated by the action of waves and to move one pair of operating arms and the weight side of the endless conveyer upward when the said float is lowered by the action of waves; and means

cured to the shaft and adapted to move the other pair of parallel operating arms and the weight side of the endless conveyer upward when the float is raised by the action of waves.

3. A wave motor comprising a suitable frame-work; a wheel having pockets on the periphery thereof and rotatably mounted within the frame-work; a series of weights adapted to engage the pockets; an upper incline arranged to deliver weights to the top of the wheel and into the pockets thereon; an endless conveyer adapted to convey weights to the upper incline; a lower incline arranged to convey weights from the bottom of the wheel to the bottom of the conveyer; suitable bell-cranks pivotally mounted upon the endless conveyer and adapted to convey the weights on the said conveyer and to deliver the same to the upper incline; a shaft rotatably mounted within the frame-work; parallel beams secured to the shaft; a pair of parallel operating levers pivotally mounted upon the ends of the beams, said operating levers being arranged to engage the endless conveyer and move that side of the said conveyer containing the weights upward when the said arms move upward and to release the said conveyer when the said arms move downward; a suitable float operatively connected to the shaft and adapted to be operated by the action of waves and to move one pair of operating arms and the weight side of the endless conveyer upward when the said float is lowered by the action of waves; and suitable counterweights secured to the shaft and adapted to move the other pair of parallel operating arms and the weight side of the conveyer upward when the float is raised by the action of waves.

In witness whereof I hereunto set my signature in the presence of two subscribing witnesses.

RICHARD ROUNTREE.

Witnesses:
KARL F. SCHULTZ,
JAMES MCCUE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."