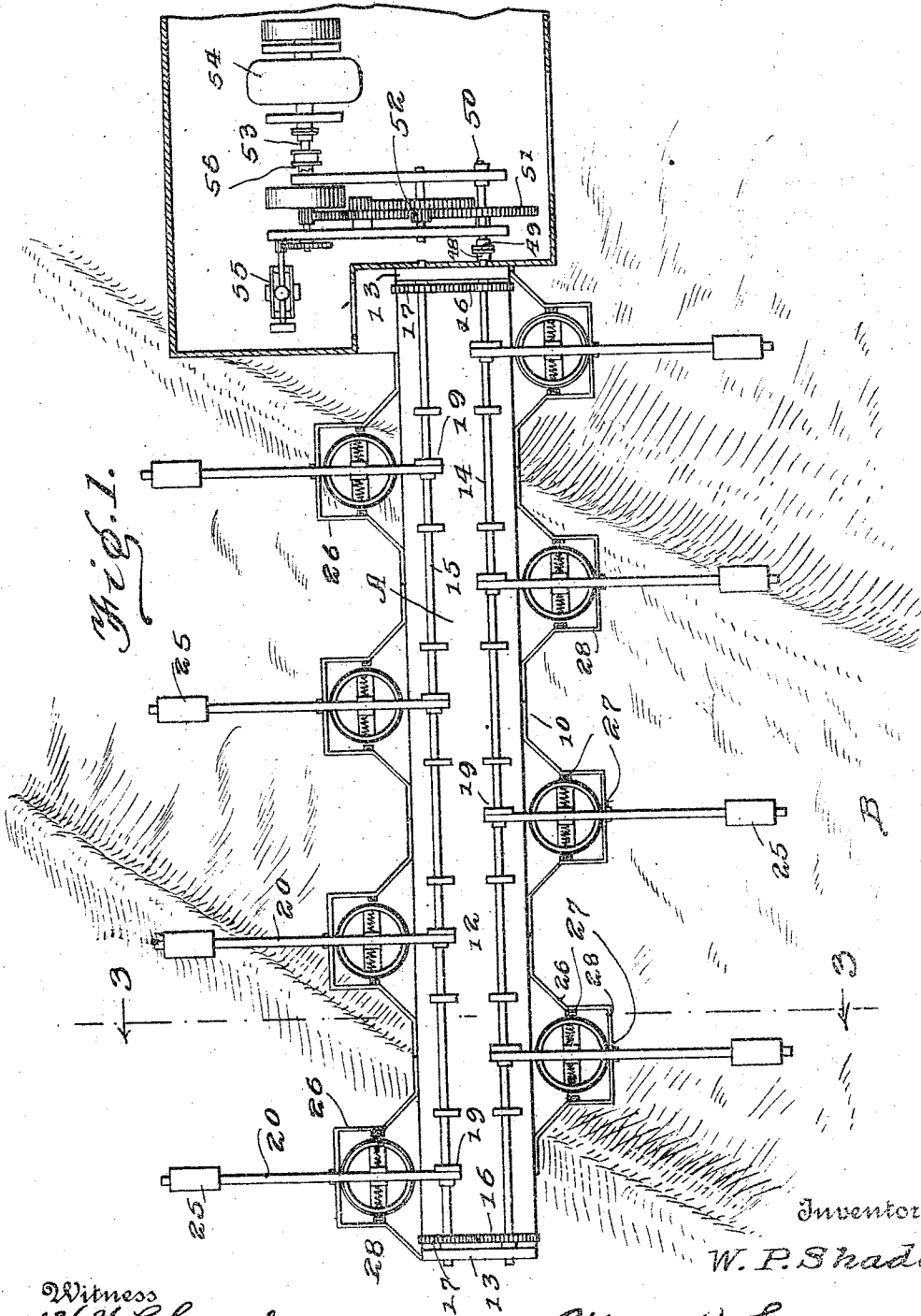


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APPLICATION FILED OCT. 13, 1917.

Patented June 18, 1918
3 SHEETS—SHEET 1.

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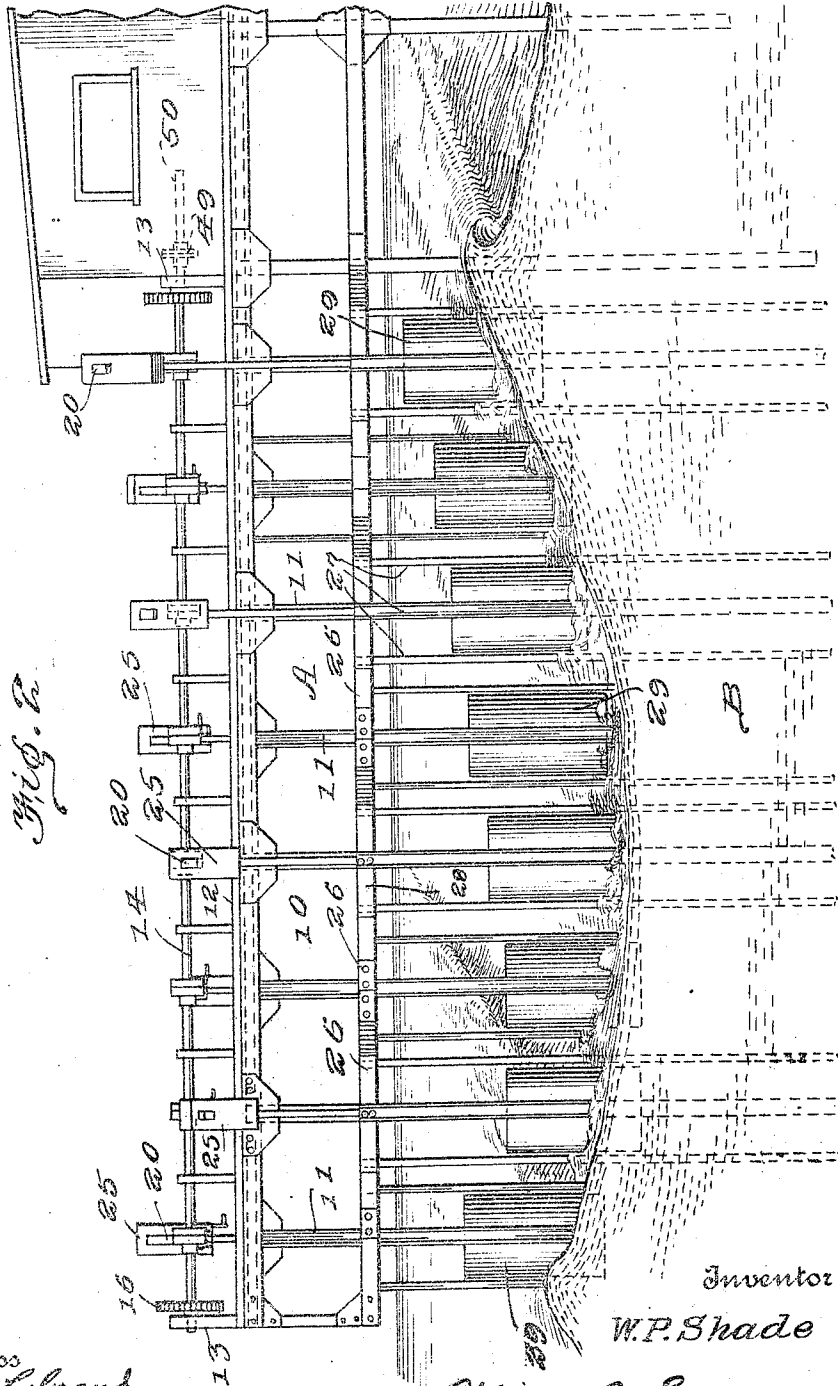
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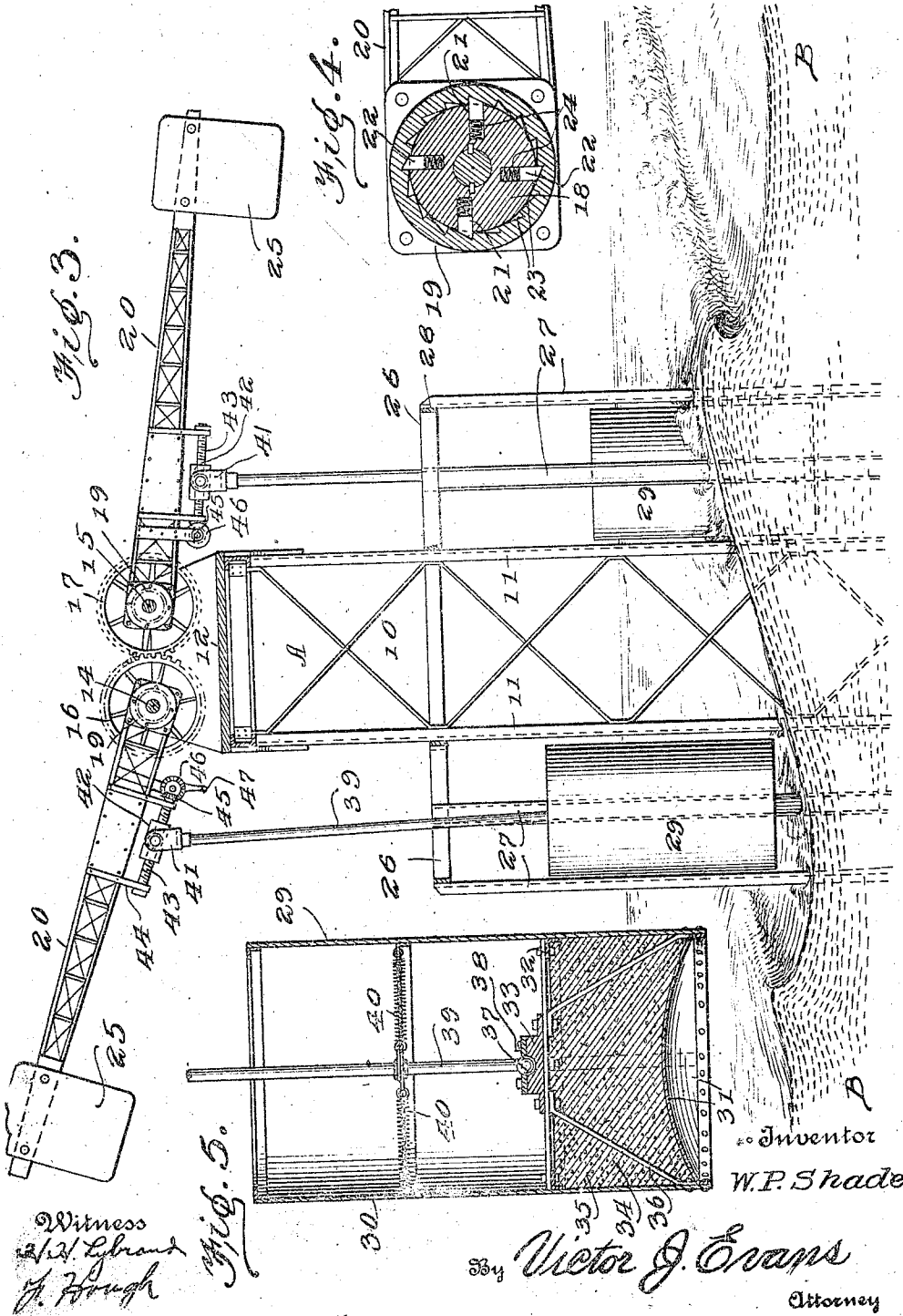
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UNITED STATES PATENT OFFICE.

WILLIAM P. SHADE, OF HOLLIDAYSBURG, PENNSYLVANIA

POWER-GENERATING APPARATUS.

1,270,221.

Specification of Letters Patent. Patented June 18, 1918.

Application filed October 13, 1917. Serial No. 196,439.

To all whom it may concern:

Be it known that I, WILLIAM P. SHADE, a citizen of the United States, residing at Hollidaysburg, in the county of Blair and State of Pennsylvania, have invented new and useful Improvements in Power-Generating Apparatus, of which the following is a specification.

This invention relates to an apparatus which may be employed to supply power for the operation of power operated devices and particularly power operated devices such as dynamos and the like which generate energy for the operation of other machines.

The primary object of the invention is to provide an inexpensive apparatus of this character which will comprise comparatively few parts and is so constructed that the operation of the apparatus may be accomplished with the waves from the sea, or from any other body of water suitable for the purpose.

Another object of the invention is to provide an apparatus with mechanism whereby the power generated by the apparatus may be controlled and transmitted to the device to be operated thereby in such a manner that the continuous operation of the device to which the power is transmitted is assured.

Another object of the invention is to provide an apparatus of this character wherein the rotation of a pair of drive shafts is accomplished through the raising and lowering of a plurality of float operated weight controlled arms connected with the shafts.

A further object of the invention is to so connect the floats and weights with the arms and the arms with the drive shafts, that the drive shafts will be unaffected by the raising of the arms upon the rise of the floats, but upon the lowering of the arms as the floats fall, the arms will be locked to the drive shafts for the turning thereof.

With these and other objects in view, the invention resides in the novel combination and arrangement of parts, which will be hereinafter described and particularly pointed out in the claims.

The preferred embodiment of the invention has been illustrated in the accompanying drawings, although no restriction is

necessarily made to the precise details of construction therein shown, as changes, alterations, and modifications within the scope of the claims may be resorted to when desired.

In the drawings:—

Figure 1 is a top plan view of a power generating apparatus constructed in accordance with the invention.

Fig. 2 is a view in side elevation thereof.

Fig. 3 is a vertical transverse section through Fig. 2.

Fig. 4 is a detail sectional view through the ratchet connection between the float operated weight controlled arms and the drive shafts.

Fig. 5 is a detail sectional view through one of the floats.

Referring now to the drawings in detail wherein a power generating apparatus A has been shown constructed in accordance with the invention and extending within a body of water B to permit the operation of the apparatus to be accomplished by the waves therefrom.

The power generating apparatus includes a pier 10 which extends within the body of water B and comprises a plurality of spaced and suitably braced uprights or piles 11, upon which is mounted a platform 12. Extending longitudinally of the platform 12 and mounted to turn in bearings 13 therein is a pair of spaced drive shafts 14 and 15. Fixed to the drive shaft 14 adjacent its ends are gear wheels 16 which mesh with similarly arranged gear wheels 17 on the shaft 15, so that when either of the drive shafts is turned the other drive shaft connected therewith will be simultaneously turned.

Fixed to each of the shafts 14 and 15 is a plurality of disks 18 preferably four in number with each disk arranged within a boxing 19 at the inner end of an arm 20 through which the shaft upon which the disk is mounted is passed. Each disk 18 has formed therein radially extending pockets 21 which open out through the periphery of the disk and in these pockets are latch pins 22 which are yieldably held in engagement with teeth 23 on the inner peripheral wall of the boxings 19 by springs 24 within the pockets 21.

Through the above described manner of

connecting the arms 20 with the shafts 14 and 15 it will be apparent with reference to Fig. 4 in the drawings that the arms 20 may be raised, or turned about the shafts 14 and 15 in one direction without imparting movement to the shafts, but as the arms are turned about the shaft in the reverse direction or lowered, under the influence of weights 25 upon the arms and floats herein-
 10 after described, the arms will be locked to the shafts 14 and 15 for the turning thereof.

Secured to the sides of the pier 10 are a plurality of brackets 26 which are arranged in pairs beneath the arms 20 with each pair
 15 of brackets having connected therewith spaced and vertically extending guides 27 which coact with the brackets in providing frames 28.

Each frame 28 has arranged therein a float 29 which comprises an open top cylindrical casing 30 which is free to move in a vertical plane within the frame 28 upon the guides 27. The lower end of the casing 30 is closed by a plate 31 suitably connected with
 25 the casing 30 and of concavo convex shape in cross section not only to serve as a brace for the casing 30 but to provide a pocket at the lower end of the casing to facilitate the raising of the float within the frame 28 by the waves from the body of water B. Mounted within the casing 30 between its ends is an annulus 32 to which is secured a partition 33 which coacts with the plate 31 in providing a compartment 34 in the float
 35 for the reception of ballast 35 by means of which the floats 29 are normally maintained partly submerged in the body of water B. Shifting of the ballast 35 in the compartment 34 is prevented by stay rods 36 preferably four in number, thus permitting these rods also to effectually brace the partition 33 and casing 30.

Arranged centrally of the partition 33 is a socket 37 in which is received a ball 38 at the lower end of a stem 39. The stem 39 is held in axial alinement with the casing 30 by a plurality of resilient members 40 which in this instance have been shown as coiled contractile springs extending radially from
 50 the stem 39 and connected with the casing 30. The stem 39 extends above the upper end of the casing 30 and is provided with a forked head 41 with which is pivotally connected an internally threaded sleeve 42. The sleeve 42 has passed therethrough a threaded shaft 43 which is mounted to turn in bearings 44 upon one of the arms 20 which is in line with the frame in which the float is mounted to which the stem is connected.

Through the above described manner of connecting floats with the arms 20 and arranging the floats in the frames 28 it is apparent with references to Fig. 3 in the drawings that as the floats are raised in the
 65 frames 28 by the action of the waves from

the body of water B the arms 20 will be raised on the shafts 14 and 15.

In order that the extent to which the arms 20 may be raised and lowered upon the shafts 14 and 15 may be varied each shaft 43 has fixed to the one end thereof a gear wheel 45 which is in mesh with a gear wheel 46 provided with an actuating handle 47 whereby the shafts 43 may be turned to move the sleeve 42 toward or away from the shafts
 75 14 and 15.

Fixed to one end of the drive shaft 14 is a clutch member 48 which is adapted to be engaged with a clutch member 49 on a shaft 50 on the platform 12. The shaft 50 has fixed thereto a gear wheel 51 included in a train of gearing 52 which is employed to transmit the power generated by the apparatus to the drive shaft 53 of a power operated device 54 also mounted upon the platform 12 and in this instance having been shown as a dynamo. The train of gearing 52 has associated therewith a governor 55 whereby the speed of the dynamo 54 may be controlled. The shaft 53 is also provided with a clutch
 85 56 by means of which the shaft may be thrown into or out of engagement with the train of gearing 52.

With a power generating apparatus constructed as above described and mounted to extend within a body of water B it will be seen with reference to the drawings that as the waves from the body of water move the floats 29 in a vertical direction in the frames 28 the arms 20 will be turned on the shafts
 100 14 and 15.

As the waves recede from beneath the floats 29 the weight of the floats and the weights 25 on the arms 20 serve to move the arms 20 in a downward direction. As the arms swing in a downward direction the ratchet mechanism which connects the arms with the shafts 14 and 15 lock the arms thereto so that the shafts 14 and 15 are turned for operation of the train of gearing 52 which, insures the continuous operation of a power driven apparatus 54.

From the foregoing description taken in connection with the accompanying drawings it is apparent that a power generating apparatus has been provided which though comparatively inexpensive of manufacture is highly efficient for the purpose set forth.

Having thus described the invention, what is claimed as new, is:—

1. In a device of the class described, a pair of drive shafts, a plurality of arms through which said shafts are passed, a ratchet connection between said drive shafts and arms, weights on said arms, vertically movable floats beneath said arms, stems pivotally connected with said floats and extending above the same, internally threaded sleeves carried by said stems, threaded shafts passing through said sleeves mounted to turn on said
 125 130

arms, and means operable to turn said threaded shafts.

2. In a device of the class described, a float comprising a casing having a ballast compartment therein, a stem extending within said casing connected therewith above said compartment, and resilient members extending radially from said stem and connected with said casing.

10 3. In a device of the class described, drive shafts, means operable to turn said shafts in one direction, open topped cylindrical bodies mounted to reciprocate beneath said means, stems extending above the tops of said
15 bodies pivotally connected therewith, means for yieldably holding said stems in axial alinement with said bodies, and sleeves

swingingly connected with said stems slidably connected with said means.

4. In a device of the class described, 20 weighted arms, floats swingingly connected with the arms movable longitudinally thereof, boxings at one end of said arms having bearing openings therein, teeth on the wall of said openings, disks in said openings 25 having pockets opening out through the periphery of said disks, latch pins in the pockets in said disks yieldably held in engagement with the teeth on the wall of said openings, and connected shafts to which the 30 said disks are fixed.

In testimony whereof I affix my signature.

WILLIAM P. SHADE.