

No. 824,408.

PATENTED JUNE 26, 1906.

E. B. CADE.

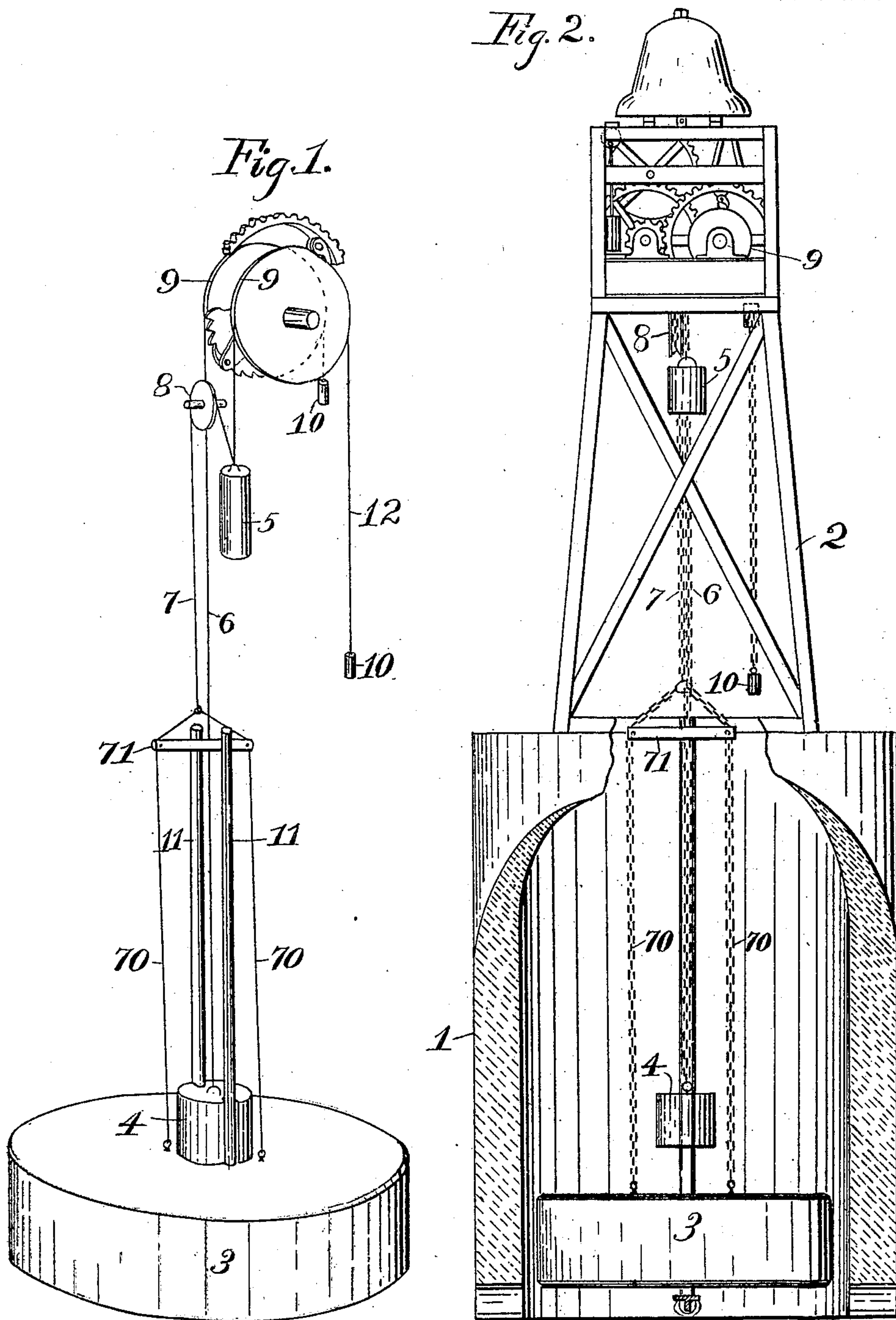
TIDE POWER SIGNALING APPARATUS.

APPLICATION FILED MAR. 1, 1905.

3 SHEETS—SHEET 1.

Fig. 2.

Fig. 1.



WITNESSES:

Rufus B. Clark
Stephen A. Brooke

INVENTOR.

Enos B. Cade
BY *Frank C. Adams*
ATTORNEY.

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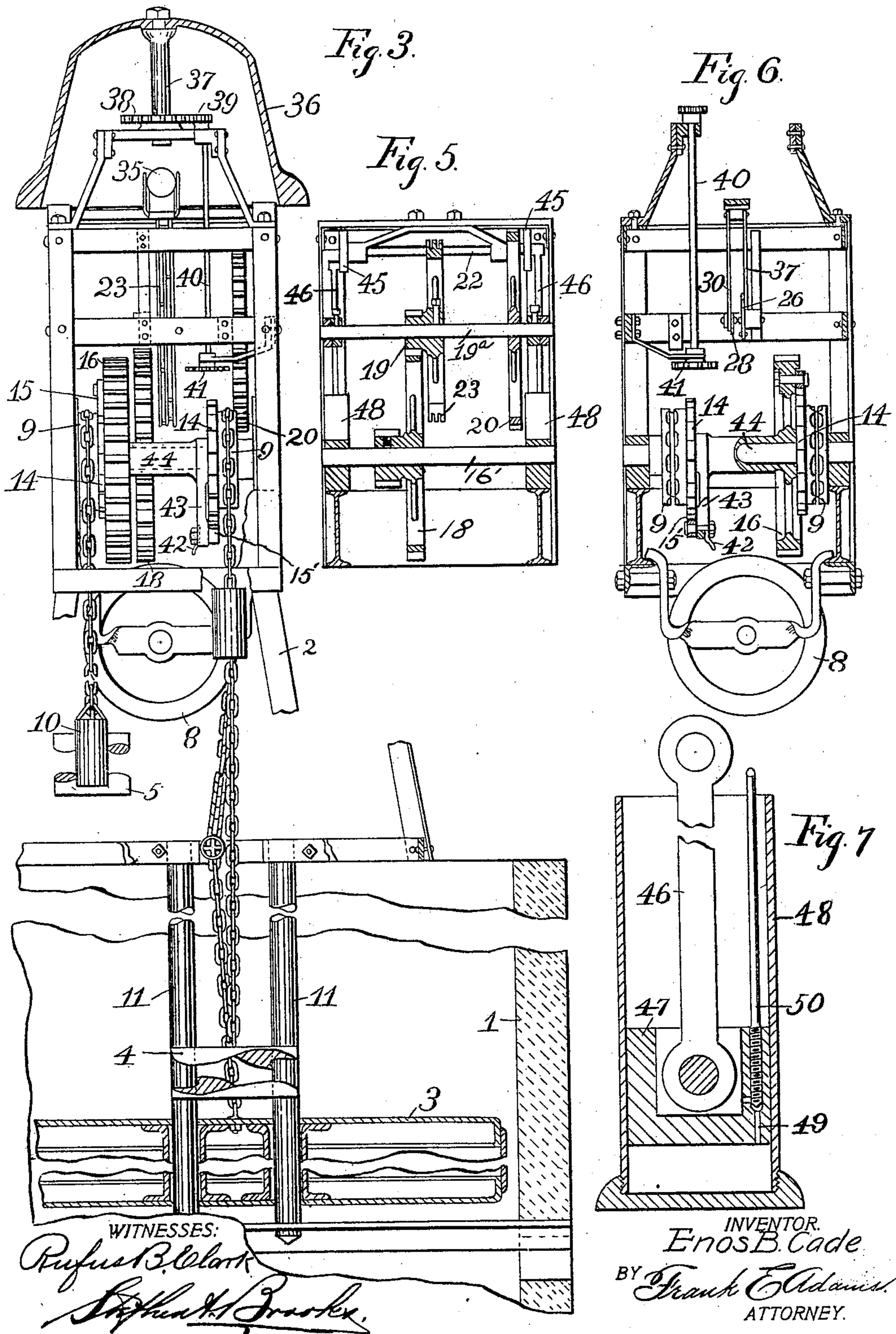
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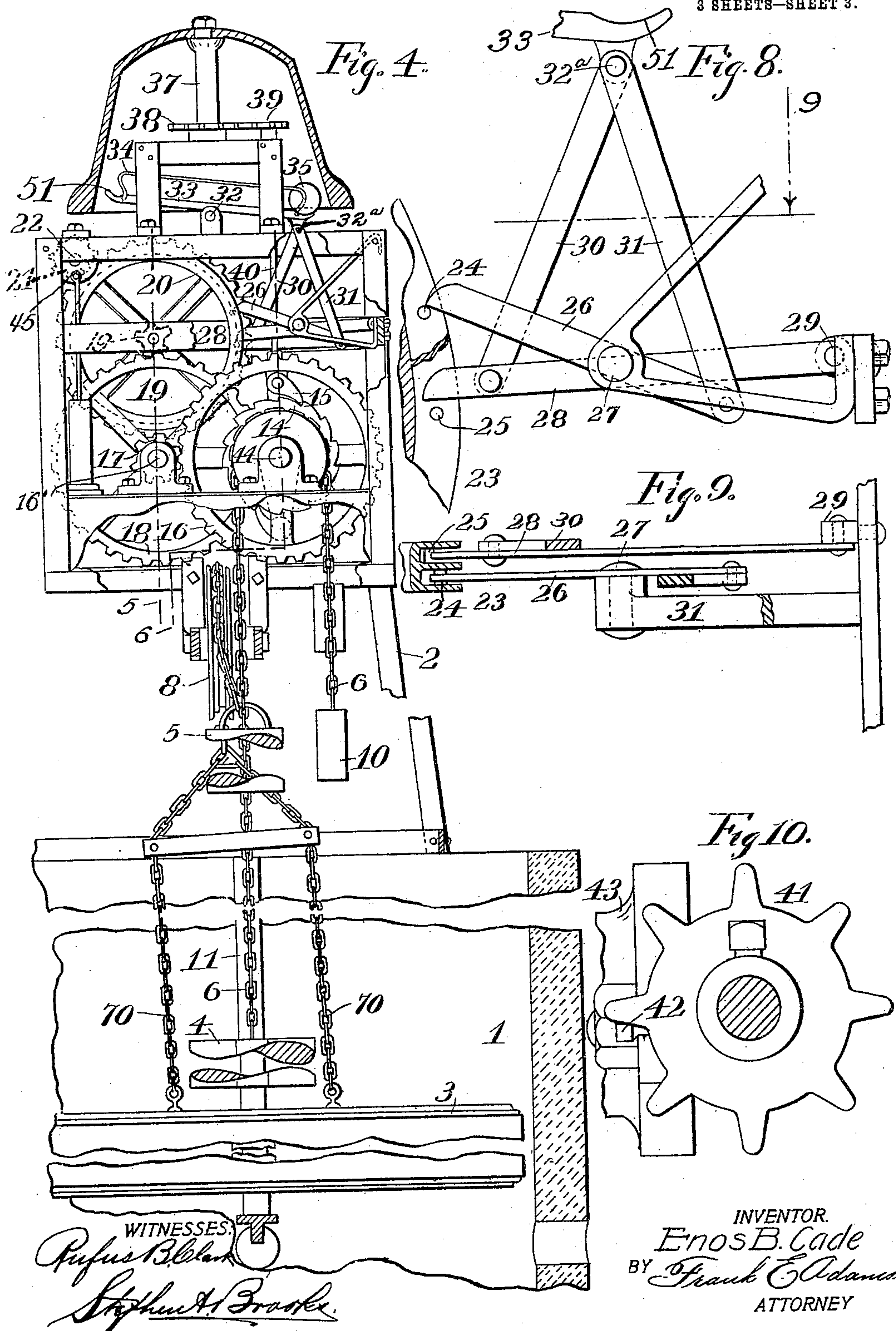


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3 SHEETS—SHEET 3.



UNITED STATES PATENT OFFICE.

ENOS B. CADE, OF SEATTLE, WASHINGTON.

TIDE-POWER SIGNALING APPARATUS.

No. 824,408.

Specification of Letters Patent.

Patented June 26, 1906.

Application filed March 1, 1905. Serial No. 247,959.

To all whom it may concern:

Be it known that I, ENOS B. CADE, a citizen of the United States of America, and a resident of the city of Seattle, in the county of King and State of Washington, have invented certain new and useful Improvements in Tide-Power Signaling Apparatus, of which the following is a specification.

My invention relates to improvements in tide-power signaling apparatus; and the primary object thereof is to provide an improved and simplified signaling means.

The invention further consists in the novel arrangement and combination of parts disclosed in the drawings and fully described in the following description and defined in the appended claims.

In the accompanying drawings, forming a part of this specification, and wherein like numerals of reference indicate like parts throughout the several views, Figure 1 is a diagram showing the arrangement of the weights, ropes, and float relative to the drive-wheels of the motor mechanism. Fig. 2 is an elevation in partial section of my device. Figs. 3 and 4 are elevations, on a large scale, showing my invention from two different view points, parts being broken away and parts being in section to more clearly show the construction. Fig. 5 is a section on line 5 of Fig. 4. Fig. 6 is a section taken on line 6 of Fig. 4 with parts of the device removed. Fig. 7 is a section of the dash-pot or speed-controlling mechanism. Fig. 8 is a detail showing the mechanism used to cause the tilting action of the ball-race. Fig. 9 is a section taken on line 9 of Fig. 8. Fig. 10 is a detail showing the star-wheel mechanism used to turn the bell.

My device includes a bell or like device which is employed as a warning-signal and is operated by suitable mechanism at regular intervals, the power by which this mechanism is actuated being derived from the rise and fall of the tide.

In carrying out my invention I provide a float 3, which is preferably inclosed by a protecting-casing 1 in the form of a cylinder of any suitable material, as concrete, masonry, or iron.

The motor mechanism which is employed for operating the signal is operated not directly by the float, but indirectly through the means of two weights 4 and 5. The weight 4 is directly engaged by the float to raise it.

The weight 5 is raised by the float during its descent by means of a flexible connection, which extends from the float over an idler-pulley 8 to the weight 5. The connection shown consists of the chain 7, which divides into two branches 70, which are kept separated by the spreader 71. The weight 4 is engaged with guides, as the bars 11, which insure its travel in the desired path and prevent possible entanglement with the chain 70. These bars 11 are rigidly secured at their upper and lower ends and extend through the float 3, (see Fig. 3,) which is slidable thereon. Flexible connections, as chains 6 and 12, lead respectively from the weights 4 and 5 over two drive-wheels 9, which are mounted to turn upon main power-shaft 44. These drive-wheels are loose upon this shaft, but each has a ratchet-wheel 14 secured thereto. One of these ratchet-wheels engages a pawl 15, carried by the gear 16, and the other engages a pawl 15', carried by the arm 43, said gear and arm being both secured to the shaft 44, whereby the weight 4 turns the said shaft when the float is falling and the weight 5 turns the shaft when the float is rising. Take-up weights 10 are attached to the free ends of the chains 6 and 12 to return the chains positively while their weights are being raised. Gear-wheel 16 meshes with pinion 17, fixed on shaft 16', which also has a gear-wheel 18 secured thereto, and wheel 18 meshes with pinion 19, carried upon shaft 19^a. Gear-wheel 20 and pin-wheel 23 are also secured to shaft 19^a. Gear-wheel 20 meshes with pinion 21 upon shaft 22.

A mechanism such as that described, if unrestrained, is likely to run at such a rate of speed that it will run down too soon and the apparatus would be stopped for a time during the change from ebb to flood tide, or vice versa. To prevent this, I provide a regulator of the speed. The regulator shown consists of two dash-pots 48, which are connected with the mechanism and tend to slow it to such an extent that the power-weights will not have reached the limits of their working travel when the float has paused at the change of tide. There is thus provided a means whereby the action of the apparatus is made continuous.

The dash-pot pistons 47 are connected by piston-rods 46 with crank-pins carried by disks 45, secured to shaft 22, the crank-pins being preferably placed at right angles, so as

to secure a more uniform resistance. The dash-pot piston is provided with a passage 49, which may be more or less closed by a valve formed on the end of the rod 50. By proper adjustment of this valve the rate of movement of the mechanism may be controlled.

The mechanism above described, as well as the bell which is employed for producing the signal, is carried upon a tower 2 at such an elevation as to be above the reach of the waves. The bell 36 is mounted at the top of the tower, so that it may be readily turned about a vertical axis. This I secure by mounting the bell upon the vertical shaft 37. This shaft carries a gear-wheel 38, which meshes with a gear-wheel 39, carried by a shaft 40, to the lower end of which is secured a star-wheel 41. This star-wheel is engaged by a finger 42, carried by arm 43 upon shaft 44, so that for each turn of the shaft 44 the bell is moved through a slight angle, thereby presenting different portions of the bell to the action of its striker.

The means employed for striking the bell consist of a ball 35, mounted to roll in a ball-race 33, which is pivoted upon a pivot 32, located, preferably, near the middle of its length. This ball-race is tipped first one way and then the other by mechanism operated by the pin-wheel 23, whereby the ball is caused to run from one end of the race to the other and strike the bell.

The pin-wheel 23 is formed with two peripheral grooves. These grooves are formed by three rim-flanges which are suitably spaced apart, and a set of pins 24 is arranged between the center flange and one of the outer flanges, and another set of pins 25 between the center flange and the other outer flange. The pins of the respective sets are arranged in alternate relation to one another.

Two levers 26 and 28 are pivoted, 26 at 27, and 28 at 29, the free ends of these levers extending each between its respective flanges of the pin-wheel and in position to engage their respective sets of pins, and by reason of the arrangements of the sets of pins relatively to each other it will be observed that the free ends of said levers will be alternately raised. These levers are connected to links 30 and 31, which are pivoted, as at 32^a, to the ball-race, one being designed for tilting the ball-race in one direction and the other for tilting it in the other direction. The ends of the ball-race are preferably provided with a depression or hollow, as shown at 51, so that the ball will be retained until the race has been raised well above a level, whereby when the ball does start it will run with sufficient force to strike a smart blow. As the pin-wheel rotates the pins 24 thereof are moved successively into and out of engagement with the free end of lever 26, said pins when engaged with the free end of said

lever raising the same, as shown in Fig. 8, and as the pins move from engagement with said lever one of the pins 25 of the other set engages with the free end of lever 28 and raises the same until the pin moves from engagement therewith. The lever 26 is then in position to be engaged by the next pin 24 of its set.

With the flood-tide the float 3 rises, lifting with it weight 4, causing the flexible connection 6 to become slack, and consequently producing no action upon its respective drive-wheel 9. Meanwhile the flexible connections 70, 70, and 7 become slack, and the weight 5 is permitted to gradually fall, thus rotating its respective drive-wheel. As the tide ebbs the float 3 is lowered, lifting weight 5 through the flexible connections, thus discontinuing the action of the said weight upon its respective wheel. The weight now begins its gradual descent, during which motion is imparted thereby to its respective drive-wheel. From the above it will be observed that one or the other of the drive-wheels 9 is being rotated in a positive direction by a weight, the described ratchet mechanism imparting motion to the gear 16, from which it is in turn transmitted by the described mechanism to the bell-striking apparatus.

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

1. In an apparatus of the type set forth, the combination with a rotatably-supported bell, a striker immovable with the bell, a motor actuated by variations of water-level, means for actuating said striker from said motor, and means operated by said motor to rotate said bell.

2. In an apparatus of the type set forth, a bell, a centrally-pivoted member, a ball carried thereby, alternately-operated levers connected to the one end of said pivoted member, one of said levers being capable of raising the one end of said pivoted member and the other lever of lowering the same end of said pivoted member.

3. In an apparatus of the type set forth, a bell, a tiltable ball-race, a ball therein, a motor, means operated thereby for alternately raising and lowering one end of said ball-race, and means for rotating said bell during the tilting of said ball-race.

4. In an apparatus of the type set forth, a bell, a tiltable ball-race, a motor-wheel, a pair of links connected to the same end of said ball-race, and a pair of levers connected with said motor-wheel, each link being connected to one of said levers, and means whereby said ball-race is tilted in opposite directions by said links and levers.

5. In a device of the type set forth, a bell, a motor means, means carried thereby for intermittently rotating said bell, a pin-wheel, a pair of levers alternately raised thereby, a

ball-race, a bell-striking ball carried thereby, and means connected with said levers for alternately raising and lowering the same end of said ball-race.

5 6. In a device of the type set forth, a bell, a motor means, a tiltable ball-race, a ball for striking said bell, a lever pivoted at its rear, a link connected to the front end thereof and to one end of said ball-race, a second lever piv-
10 oted centrally, a link connected to the rear end

thereof and to the same end of the ball-race as the other link, said levers having their front ends raised alternately by said motor means.

Signed at Seattle, Washington, this 7th 15 day of February, 1905.

ENOS B. CADE.

Witnesses:

HASWELL J. RAMSEY,
LAVINIA JONES.