No. 622,283. Patented Apr. 4, 1899.

J. C. SMITH.

AUTOMATIC SIGNAL BUOY.

(Application filed Oct. 15, 1898.)

(No Model.) 3 Sheets—Sheet 1.

Fig. 2.

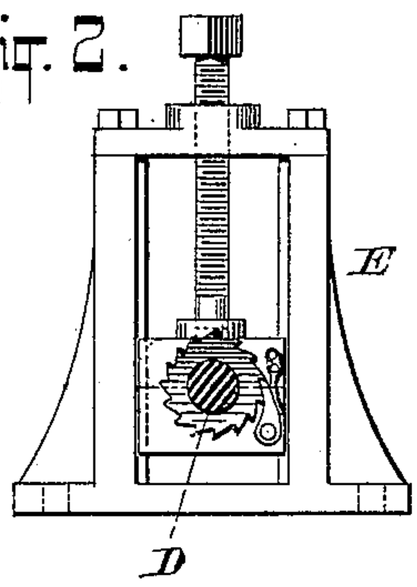


Fig. 1.

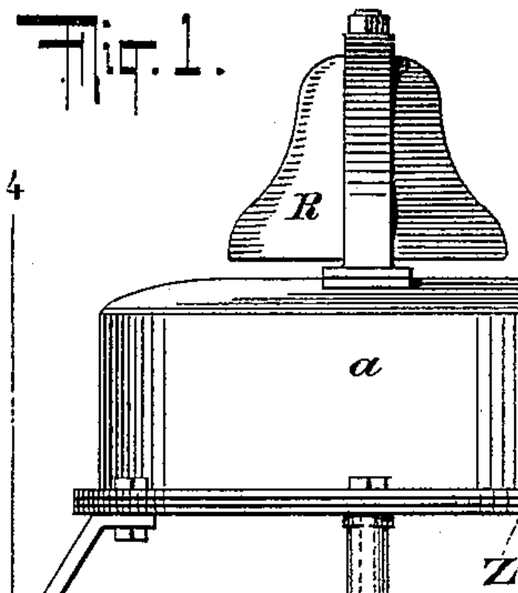
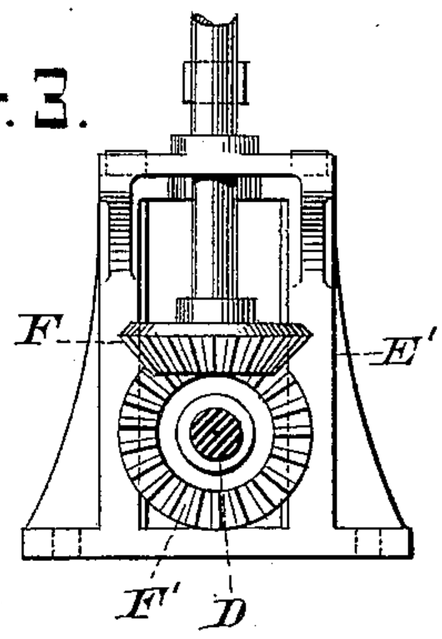
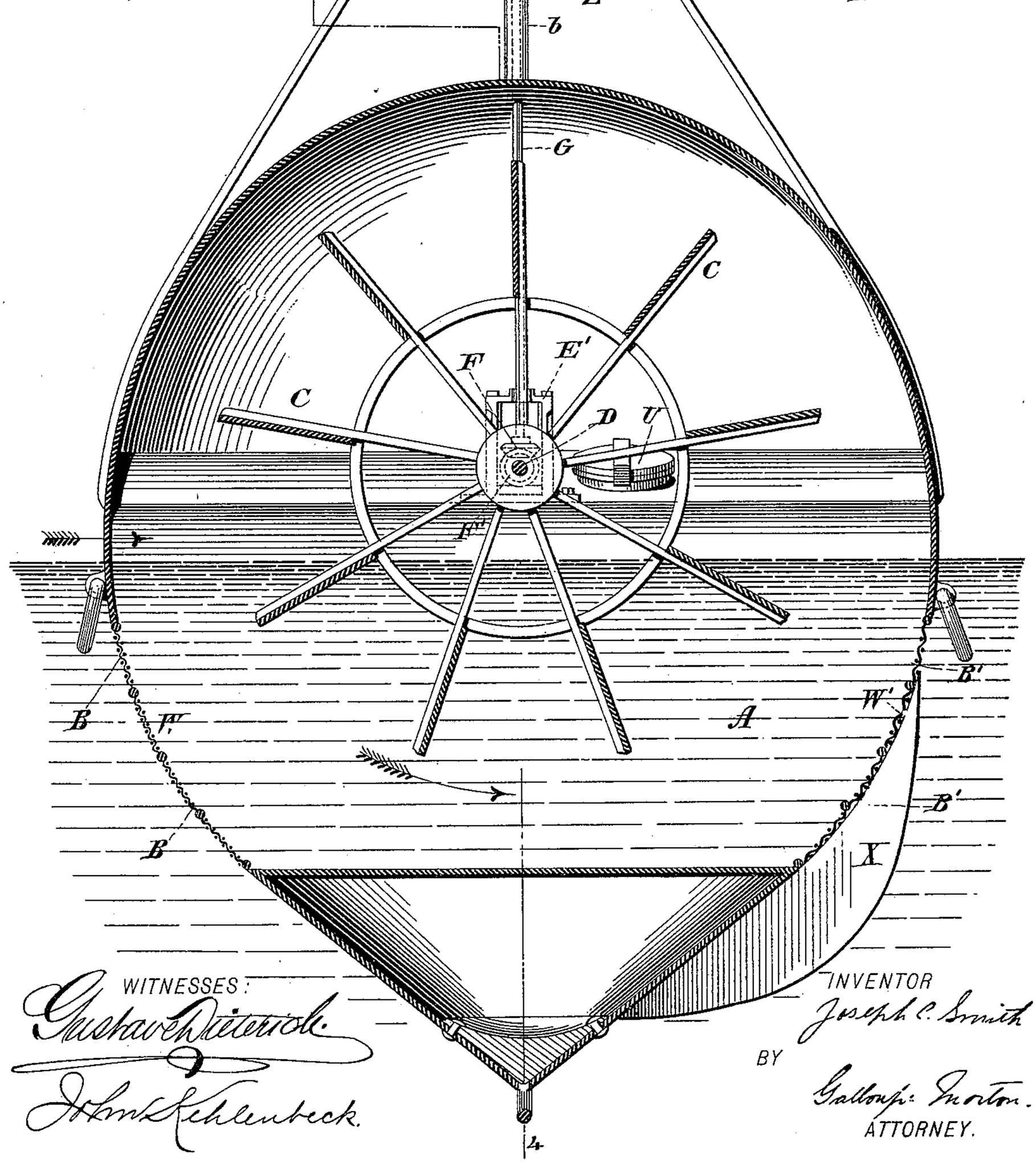


Fig. 3.





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(No Model.) 3 Sheets—Sheet 2.

Fig. 6.

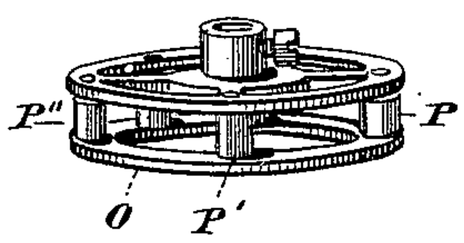

Fig. 4.

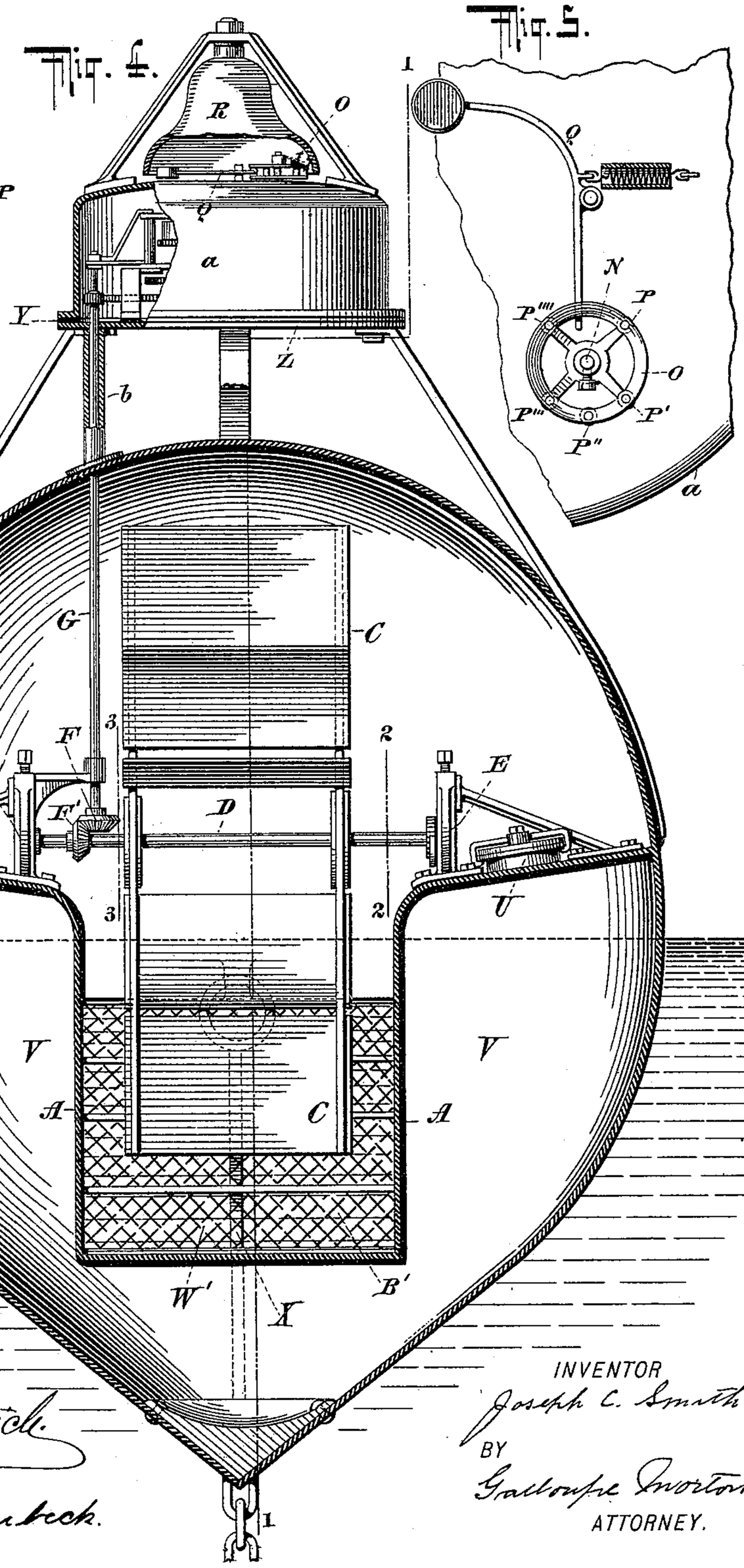

Fig. 5.

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(No Model.) 3 Sheets—Sheet 3.

Fig. 7.

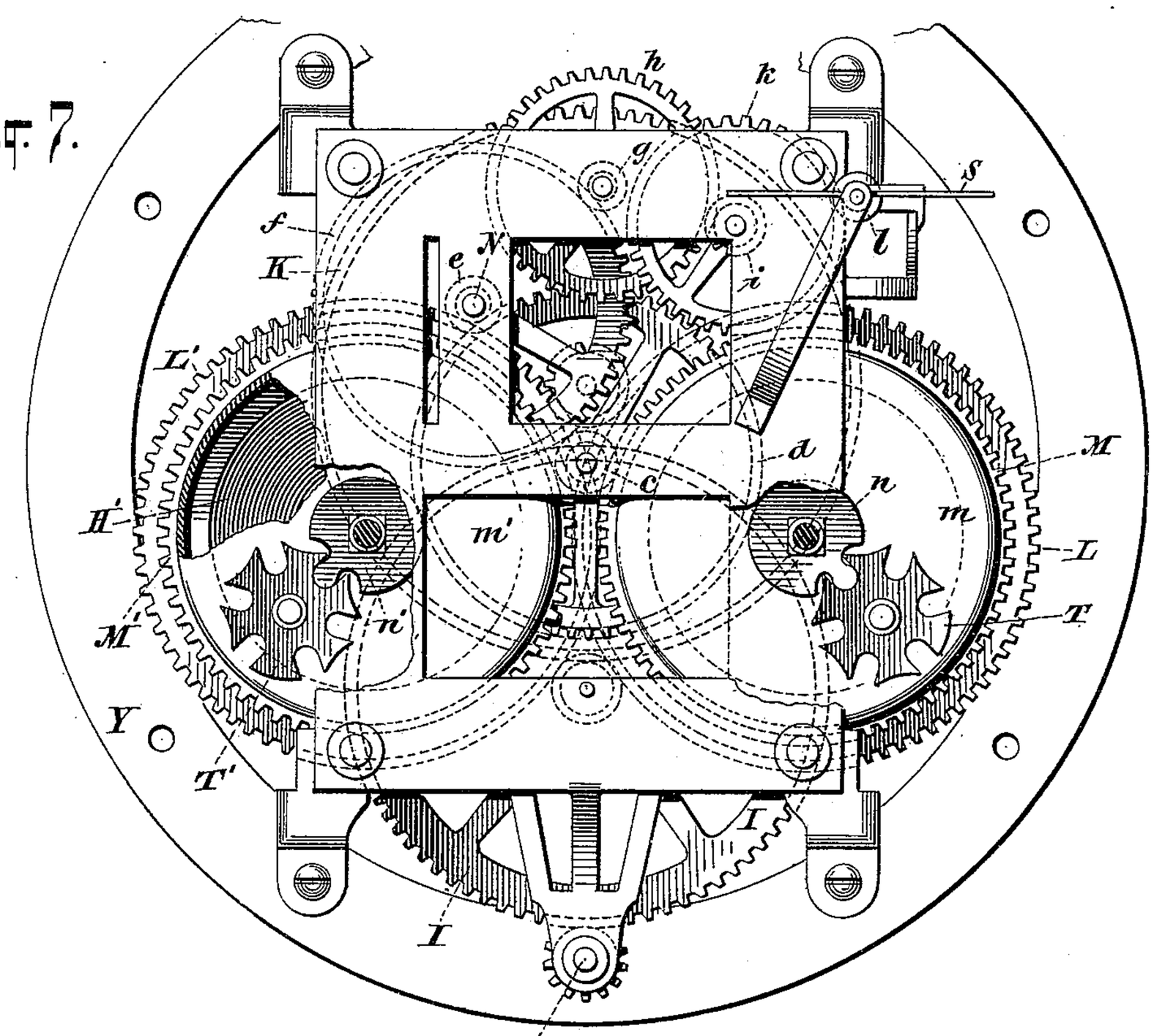
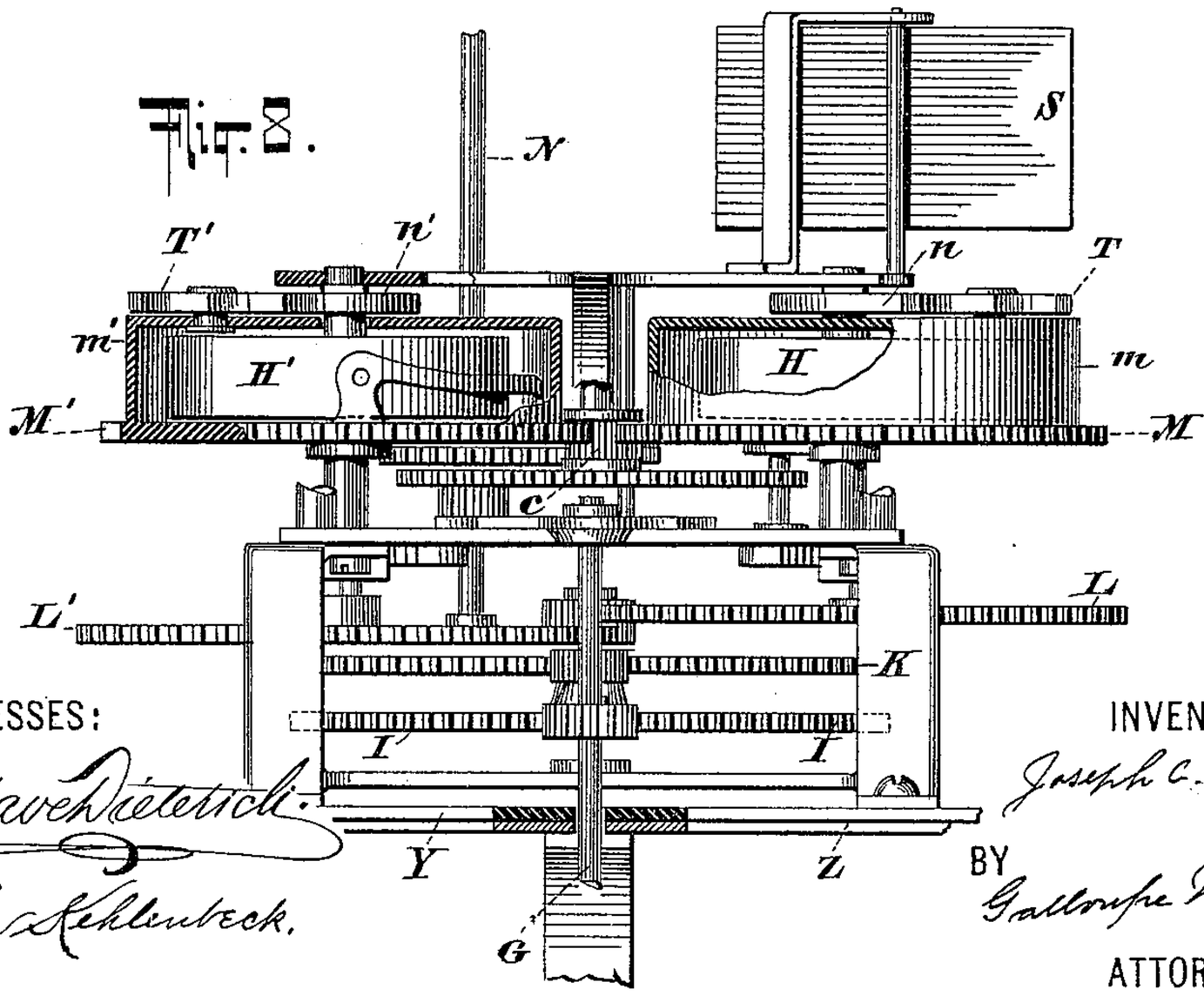


Fig. 8.



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UNITED STATES PATENT OFFICE.

JOSEPH C. SMITH, OF NEW YORK, N. Y.

AUTOMATIC SIGNAL-BUOY.

SPECIFICATION forming part of Letters Patent No. 622,283, dated April 4, 1899.

Application filed October 15, 1898. Serial No. 693,675. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH C. SMITH, a citizen of the United States, residing at New York, in the county of Richmond and State of New York, have invented certain new and useful Improvements in Automatic Signal-Buoys, of which the following is a specification.

My invention relates to an automatic signal-buoy for indicating a navigable channel or to mark the position of an obstruction to navigation.

Heretofore all automatic signal-buoys have depended for their motive power either upon the movements of the waves or the flow of the tides. In one case they are inoperative during periods of calm and in the other during slack water.

The object of my invention is to provide a buoy which shall give forth signals continuously, yet be dependent solely on the tides or other currents for power. I accomplish this result by placing in my buoy a power-reservoir in which power is stored during the flow of the tides or other currents and from which power is continuously supplied to my signaling device.

My invention is fully disclosed in the following specification, of which the accompanying drawings form a part.

Figure 1 is a vertical cross-section of my improved buoy; Fig. 2, a section on line 2 2; Fig. 3, a section on line 3 3; Fig. 4, a cross-section of buoy on line 4 4; Fig. 5, an enlarged plan view of striking mechanism; Fig. 6, an enlarged perspective view of detail of striking mechanism; Fig. 7, an enlarged plan view of spring-motor here referred to as "power-reservoir" as it would appear upon the removal of the cover, showing in detail arrangement of gear-springs, check-wheels, governor, &c.; Fig. 8, an enlarged vertical cross-section of spring-motor, showing details of springs, gears, governor, check-wheels, &c.

Similar letters refer to similar parts throughout the several views.

A sluiceway A, connecting with the exterior of the buoy by the openings B B′, contains a vertical water-wheel C, carried on a horizontal shaft D, which may be raised or lowered in the guides E E′, connected by beveled gears F F′ with the vertical shaft G, by which power is transmitted to the springs H H′ through the train of gear-wheels I K L L′. From the springs H H′, the outer ends of which are fastened to the gear-wheels M M′, the power is transmitted by the gear-wheels M M′ to the gear-wheel *c*, which is fastened to the gear-wheel *d*, which meshes with the gear-wheel *e* to the vertical shaft N, which also carries the wheel O, bearing rollers P P′ P^2 P^3 P^4, engaging the pivoted hammer Q, which strikes the bell R. As here shown, the unwinding of said springs is controlled by the common form of fan-governor S, connected with the gear-wheel *f*, which is mounted on the shaft N, through the train of gears *g h i k l*, *f* meshing with *g*, *h* with *i*, and *k* with *l*; but any other form of governor may be adopted as may be found best. Overwinding of said springs is prevented by the check-wheels T T′, mounted on the "power-houses" *m m′*. These operate in the ordinary way, namely: At each revolution of the gear-wheels L L′ the wheels *n n′*, which are mounted on the same shaft with L L′, cause the check-wheels T T′ to revolve one-sixth (in this case) of a revolution. This continues as long as the ends of the arms on the wheels T T′ are concave, but will be impossible when the arm having a convex end is reached, as the two wheels will then jam. Thus the number of turns which the springs can be wound can be predetermined by the number of arms on the wheels T T′. As the power-houses rotate with the unwinding of the springs it will cause the wheels T T′ to travel around the wheels *n n′*, and at each revolution of the power-houses will turn the check-wheels T T′ one-sixth (as here shown) of a revolution in the direction opposite to that while winding up, thus permitting the springs again to be wound when power is applied.

U U′ are manholes opening into the buoyancy-chamber V V.

W W′ are gratings covering the openings B B′, W being small mesh, so that any object passing through will be unable to clog the wheel and can escape through the larger mesh of grating W.

X is a fin or rudder; Y, a rubber gasket making a tight joint between the platform Z, carrying the spring-motor, and *a* the covering of

the same, said cover and platform respectively being supplied with suitable stuffing-boxes where shafts pass through.

b is a tube protecting shaft N.

The shape of the buoy, the method of transmitting power from the current-motor to the power-reservoir and from the reservoir to the signaling device, the form of governor, and the check to prevent overwinding are preferably as shown in the drawings; but other forms may be employed.

The operation of my improved buoy is as follows: Whenever the tide or other current is flowing, the fin will cause the opening B to be presented to the current, which in its passage through the sluiceway will revolve the water-wheel, and thus wind the springs of the spring-motor. The springs will continuously give out power for operating the signal devices, the governor being so adjusted that the time in which the springs run down will considerably exceed the time required to wind the same, thus furnishing power during the period when the wheel is inoperative, as at slack water.

I have in accompanying drawings shown the particular mechanism which I consider best suited to accomplish the desired result; but it is obvious that any of the mechanical equivalents for the various parts may be substituted without departing from the spirit of my invention, as a propeller, horizontal water-wheel, or other water-motor in place of the one here shown. Other methods for storing power, the winding up of a weight, the compressing of air into a tank, storing of power in a storage battery, and the power thus stored may be used to operate other signaling devices—a whistle or visible light signal.

As shown in the drawings, the rollers on the wheel of the striking mechanism are so spaced that the bell will be struck at definite but varying intervals. Thus by the proper spacing of these rollers any desired number, as the chart-number of the buoy, may be given, and it is obvious that substantially the same device can be used to give the chart-number, even if a whistle or flash-light is substituted for the bell.

While I have described my invention as applied to a buoy, it is evident that it is equally applicable to a fixed beacon. The period during which the water-wheel will be operative in that case would be of shorter duration only—that is, during the time when the current was running in the direction indicated by the arrow, Fig. 1, and when the water was sufficiently high to reach the bucket of the water-wheel, the mechanism and its operation remaining in all respects unchanged, only such changes in the shape and structure of the buoy being made as might be advisable to adapt it for a fixed beacon.

I claim as my invention—

1. In a buoy or beacon, the combination substantially as hereinbefore set forth, of a bell, a power-reservoir adapted to operate the said signaling device and a current-operated motor adapted to charge said power-reservoir.

2. In a buoy or beacon the combination, substantially as hereinbefore set forth, of a bell, a mechanism for giving a particular signal-number corresponding to the chart-number of said buoy or beacon, a reservoir of power adapted to operate said signaling device and a current-operated motor adapted to charge said reservoir.

3. In a buoy or beacon, the combination substantially as hereinbefore set forth, of a bell, a power-reservoir adapted to operate said signaling device and a vertical current-wheel adapted to charge said power-reservoir.

4. In a buoy or beacon the combination substantially as hereinbefore set forth, of a bell, a mechanism for giving a particular signal corresponding to the chart-number of said buoy or beacon, a power-reservoir adapted to operate said signaling device and a vertical current-wheel.

5. In a buoy or beacon the combination, substantially as hereinbefore set forth, of a current-operated motor, one or more springs, a train of gear-wheels adapted to wind said springs by the operation of said motor, other gear-wheels adapted to transmit the power of said springs to the signaling device of said buoy or beacon, and a signaling device.

6. In a buoy or beacon the combination, substantially as hereinbefore set forth, of a current-operated motor, a clutch to prevent the reversal of said motor, beveled gears for transmitting the power of said motor to an upright shaft; gear-wheels transmitting said power to one or more springs, a safety-clutch to prevent overwinding of said springs, a train of gears to transmit the power of said springs to the signaling mechanism, a governor to regulate the speed of said signaling mechanism, and a signaling device.

7. In a buoy or beacon the combination substantially as hereinbefore set forth of a current-operated motor, beveled gears for transmitting the power of such motor to an upright shaft, gear-wheels (so connected with said shaft and each other that the last shall revolve at a speed considerably less than the speed of said shaft) transmitting power to one or more springs, a train of gears to transmit the power of said springs to a signaling device, and a signaling device.

8. In a buoy or beacon, the combination, substantially as hereinbefore set forth, of a current-operated motor, a power-reservoir, a pear-shaped buoy, having a suitable sluiceway therein, and a covered platform containing the power-reservoir, carried on supports above said buoy.

9. In a buoy or beacon the combination, substantially as hereinbefore set forth, of a current-operated motor, one or more springs adapted to be wound by said motor, a signal-

ing device adapted to be operated by said springs, a check to prevent the overwinding of said springs, and a governor to control the speed of the signaling device.

10. In a buoy or beacon the combination substantially as hereinbefore set forth of a current-operated motor, gear-wheels adapted to transmit the power of said motor to a power-reservoir, a power-reservoir adapted to operate a signaling device, and a signaling device.

11. In a buoy or beacon the combination, substantially as hereinbefore set forth, of a signaling device, springs adapted to operate said signaling device, and a current-motor adapted to wind said springs.

12. In a buoy or beacon, the combination substantially as hereinbefore set forth, of a current-motor, a reservoir adapted to be charged by said current-motor, a check to prevent the overcharging of said power-reservoir, a signaling device adapted to be operated by said power-reservoir, and a regulator to control the speed of the signaling device.

13. In a buoy or beacon, the combination substantially as hereinbefore set forth, of a power-reservoir, a signaling device adapted to be operated by said power-reservoir, means for transmitting the power from said reservoir to said signaling device, a governor to control the speed of said signaling device, a current-operated motor adapted to charge said power-reservoir, means for transmitting the power of said current-motor to said power-reservoir, and a check to prevent the overcharging of said power-reservoir.

In testimony whereof I affix my signature in the presence of two witnesses.

JOSEPH C. SMITH.

Witnesses:
HORACE A. DAVIS,
GALLOUPE MORTON.