(No Model.) 2 Sheets—Sheet 1.

J. M. FOSTER.

FOG ALARM AND BEACON.

No. 260,962. Patented July 11, 1882.

Fig. 1.

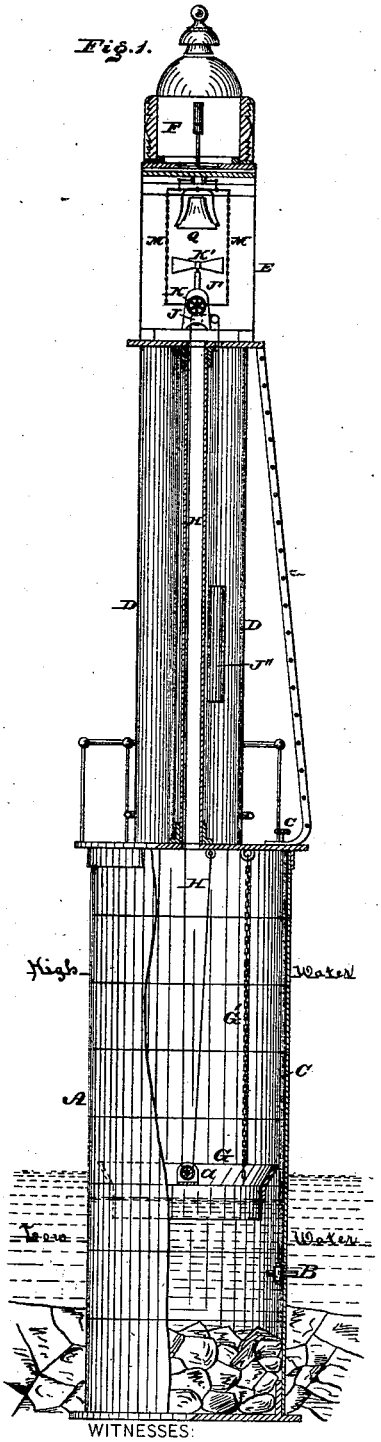
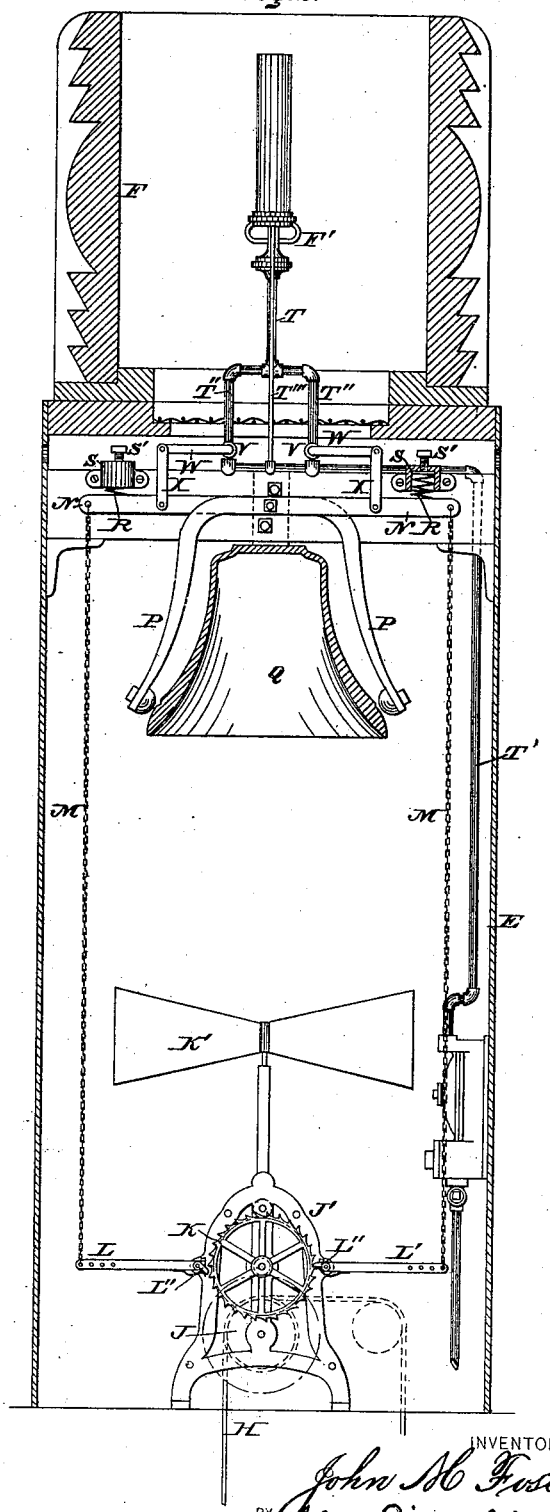


Fig. 2.



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(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

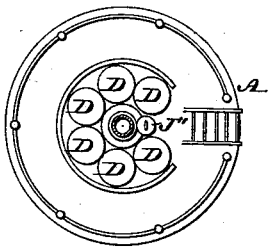


Fig. 4.

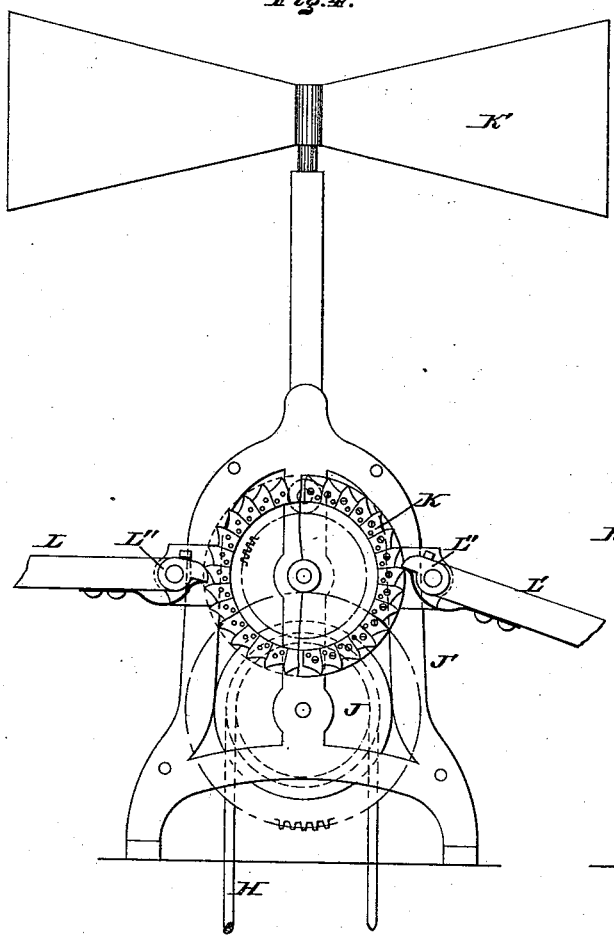
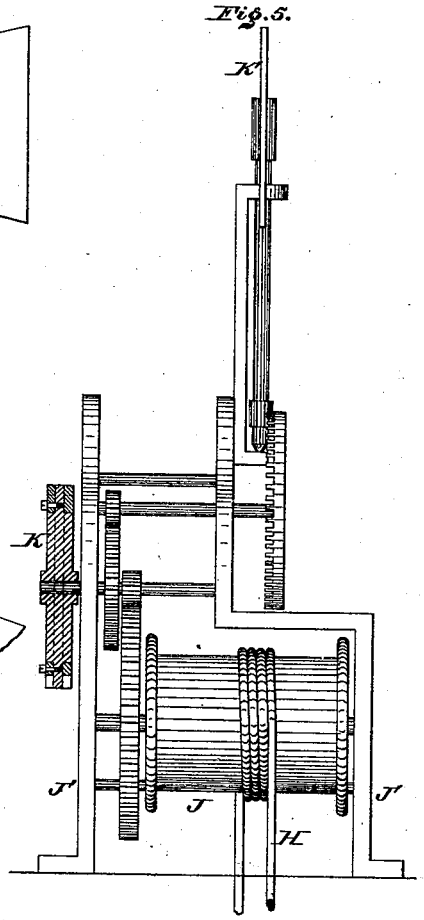


Fig. 5.



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UNITED STATES PATENT OFFICE.

JOHN M. FOSTER, OF PHILADELPHIA, PENNSYLVANIA.

FOG-ALARM AND BEACON.

SPECIFICATION forming part of Letters Patent No. 260,962, dated July 11, 1882.

Application filed January 7, 1882. (No model.)

To all whom it may concern:

Be it known that I, JOHN M. FOSTER, a citizen of the United States, residing in the city and county of Philadelphia, State of Pennsylvania, have invented a new and useful Improvement in a Fog-Alarm and Beacon, which improvement is fully set forth in the following specification and accompanying drawings, in which—

Figure 1 is a side elevation, partly broken away, of the fog-alarm and beacon embodying my invention. Fig. 2 is a vertical section of a portion enlarged. Fig. 3 is a top view of a detached part. Fig. 4 is an enlarged front elevation, partly broken away, of a detached part. Fig. 5 is a side elevation of Fig. 4, partly sectional.

Similar letters of reference indicate corresponding parts in the several figures.

My invention consists of a fog-alarm which is sounded by mechanism automatically operated by the rise and fall of tides, as will be hereinafter specified.

It also consists of means for continuing the sounding of the alarm during the interval between the tides when there is little or no movement of the water.

It further consists of a beacon having a light which is made to flash by mechanism automatically operated by the rise and fall of tides.

Referring to the drawings, A represents a caisson, which, closed at top and bottom, is properly planted on shore or on shoal places where a fog bell or alarm is required, and it may be made of metal or wood, as desired.

B represents a valve, which is connected to the caisson A and adapted to admit water into and discharge the same from said caisson, said valve having connected to it an adjusting-rod, C.

Supported on the caisson are gas tanks or holders D, on which is sustained the frame E of the alarm mechanism, the whole being surmounted by the light F.

G represents a float, which is located in the caisson A, and G′ represents chains which are suspended within the caisson from the top thereof, so as to overhang the float G.

H represents a cord or chain, which is wound around a drum, J, one end being connected to the top of the caisson and the other end having connected to it a weight, J″, said drum J being mounted on stand J′ at the bottom of the frame E, the cord or chain passing around a pulley or eye, *a*, secured to the top of the float G.

On the stand J′ are also mounted a ratchet or cam wheel, K, and a fan, K′, which are geared with the drum J by suitable pinions and spur-wheels, so as to be operated by said drum, the latter receiving rotation in opposite directions by means of the cord or chain H and rise and fall of the float G, in the manner as hereinafter set forth.

To opposite sides of the stand J′ are pivoted levers L L′, each having a spring-pressed tripping-nose, L″, the two noses pointing in reverse order and engaging with the ratchet-wheel K. This wheel is provided with two ratchets having their teeth presented in reverse directions. These teeth are detachable, so that the action of either ratchet on its pawl can be regulated by removing some of the teeth. These teeth are detachably fastened by screws or pins, or both, as shown in the drawings, and they have their operating-faces curved, so as to act on the pawls like cams, or with a rocking impact, such as that given by rocking cams to the valves of a marine engine. Each pawl yields, so as not to operate its lever while the other pawl and lever are being operated by the other ratchet of said double ratchet-wheel.

To the outer ends of levers L L′ are attached cords, chains, or rods M, whose upper ends are secured to the ends of a lever, N, which is pivoted to the top of the frame E, and carries two bell-hammers, P, which are so disposed that either of them may strike the bell Q, suspended from the top of the frame E between said hammers P.

R represents springs which bear against the ends of the lever N on the upper side thereof, said springs being fitted in sockets S, which are connected to the top of the frame E, and provided with screws S′, which are adapted to adjust the tension of the springs. The object of the springs is to restore the lever N to its normal position and prevent the bell-hammers from remaining on the bell after the latter has been struck.

The operation is as follows: The valve B is

adjusted by the rod C, so as to admit a given amount of water to the caisson A in a given time. Thus, if the minimum rise of water at the place where the structure is located is six feet in six hours, the valve is adjusted to admit five feet depth of water to the caisson in the same time, and the machinery would be adjusted to operate at the desired speed from that basis. As will be seen, the water outside of the caisson will on the flood-tide steadily gain in depth over that within the caisson until the tide has reached its full flood, at which time the water within the caisson will begin to gain on the outside until the tide begins to ebb, when both waters will reach a common level. At this point the float G will remain stationary until the water has receded a distance equal to the depth of displacement produced by sufficient weight to operate the machinery and rewind the weight J″. On the flood-tide the float G, which may be made to support a weight of one thousand pounds with a displacement of three and one-eighth inches in depth, relieves the tension on its cable and permits the weight J″, weighing, say, five hundred pounds, to start the machinery. The tendency to a slight increase of speed by reason of the difference in the two water-levels is overcome by the chains G′, which will increase the weight of the float, thus giving greater depth of displacement as it rises. On the change of tide, all proportions remaining the same as shown in the drawings, a short interval will elapse before the water recedes far enough to relieve sufficient support of weight to start the machinery, when it will reverse and run in the opposite direction from what it did on the flood-tide. This interval during which the machinery does not run can be decreased by increasing the diameter of the float. During the ebb-tide, the opening in valve B remaining the same as described on the flood-tide, the water on the outside of the caisson recedes faster than within, and the tendency to an increased speed in the fall of the float is overcome by gradually relieving it of its chain-weight. The same changes and conditions that have been described on the full flood-tide will appear on the full ebb-tide. The object of admitting and discharging the water in the caisson at a uniform rate is to regulate the speed of the machinery, and to provide as far as possible for the long interval between tides when the water remains comparatively stationary.

Heretofore the arrangement for ringing fog-bells depended, I believe, upon the weight supplemented by a fan, any increase of weight giving an increase of speed, and, *per contra*, a decrease of weight a decrease of speed, or total stoppage, so that the slightest obstruction to the machinery may stop its operation. In my invention a largely excessive weight can be employed, as the speed is regulated entirely by the rise and fall of the water in the caisson. Should it be found necessary, an automatic regulator may be provided for admitting and discharging the water to and from the caisson at a regular speed, regardless of the difference in the water-levels.

When the drum J rotates, the lever L, whose nose is held rigidly by the cam-wheel K, is operated so as to draw the cord M, to which said lever is attached. This operates the lever N and causes the bell Q to be struck. The other lever, L′, remains passive, as its nose L″ is tripped by the cam-wheel K; but when the drum is reversed the lever L′ is operated, thus causing the striking of the bell, the lever L remaining passive.

It is evident that a whistle may be employed in lieu of the bell Q, in which case plungers or pistons are connected to the lever N, so as to operate the whistle or horn, &c., if desired.

For flash purposes the burner F′ of the beacon is supplied with gas from a pipe, T, connected to a pipe, T′, which leads from the tanks or holders D.

To the pipe T′ are connected two pipes, T″, both of which communicate with the pipe T, and to said pipe T′ is also connected a small jet-pipe, T‴, whose upper end is adjacent to the burner of the beacon, the gas of said pipe constantly burning. Each pipe T″ is provided with a cock, V, the turning lever or arm W whereof is pivoted to an arm, X, which is pivoted to the lever N, the two arms X being on opposite sides of the center of said lever N. When the lever N is operated it alternately operates the cocks V, whereby the gas is alternately cut off and let on, and thus the gas of the burner, ignited at intervals by the burning gas of the jet-pipe T‴, is caused to flash, which, being visible and the alarm audible, indicates to the mariner his position.

It is evident that by some additional parts provision may also be made for rotating the lens of the beacon.

As the alarm and the flashes are simultaneous, the mariners are provided with a convenient gage of distance. By noting the interval between the receipt of the sight-signal and the receipt of the sound-signal, and applying a simple and familiar method of computation based on the ascertained rate of transmission of sound-waves, and the almost instantaneous rapidity of light, the distance will be ascertained at once.

The caisson or compartment A protects the float and other parts of the apparatus against the violence of waves.

I do not claim broadly the combination of a weight with a float, a connecting-cord, and intervening alarm mechanism operated both in ebb-tide and flood-tide, nor an alarm having its float in a compartment, being aware that such is not new.

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

1. In a fog-signal, a water-tight compartment having a regulating-valve for the admission and exit of water, in order that it may be caused to rise and fall less rapidly inside of the compartment than outside, in combination

with a float in said compartment rising and falling with the water admitted by said valve, a weight acting in opposition to the gravity of said float, and alarm mechanism which is operated by the descent of either said float or said weight, the operation continuing while the tide is at a standstill by reason of the regulated admission and exit of water, as above stated.

2. In a fog-signal, a compartment having an opening for the admission and exit of water, a float within said compartment rising and falling with the tide, a weight acting in opposition to said float, alarm mechanism operated by the descent of either said float or said weight, and a chain the slack of which accumulates on said float as it rises to compensate for the increasing pressure of the water outside.

3. In a fog-signal, a compartment having an opening for the admission and exit of water, a float within said compartment rising and falling with the tide, a weight acting in opposition to the gravity of said float, and alarm mechanism and lighting devices, both of the latter elements being operated simultaneously by said float and weight, in order that mariners may be able to ascertain their distance by noting the interval between observing the sight-signal and receiving the sound-signal.

4. In a fog-signal, a compartment having an opening for the admission and exit of water, a float within said compartment rising and falling with the water, a weight acting in opposition to the gravity of said float, a cord connecting said float and said weight, a drum turned by said cord in one direction or the other as the weight or the float descends, a double ratchet-wheel operated by said drum, levers provided with trip-pawls for engaging with the ratchets of said wheel, and hammers operated by said levers to sound an alarm, substantially as set forth.

5. In a fog-signal, a compartment having an opening for the admission and exit of water, a float within said compartment rising and falling with the water, a weight acting in opposition to the gravity of said float, a cord connecting said float and weight, a drum turned by said cord in one direction or the other as the weight or the float descends, a double ratchet-wheel operated by said drum, and having detachable teeth, levers provided with trip-pawls for engaging with the ratchets of said wheel, and hammers operated by said levers to sound an alarm, substantially as described.

J. M. FOSTER.

Witnesses:
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A. P. GRANT.