M. BOYD.

MARINE SIGNALING DEVICE.

APPLICATION FILED JULY 24, 1905.

901,677. **Patented Oct. 20, 1908.**

5 SHEETS—SHEET 1.

Fig. 1.

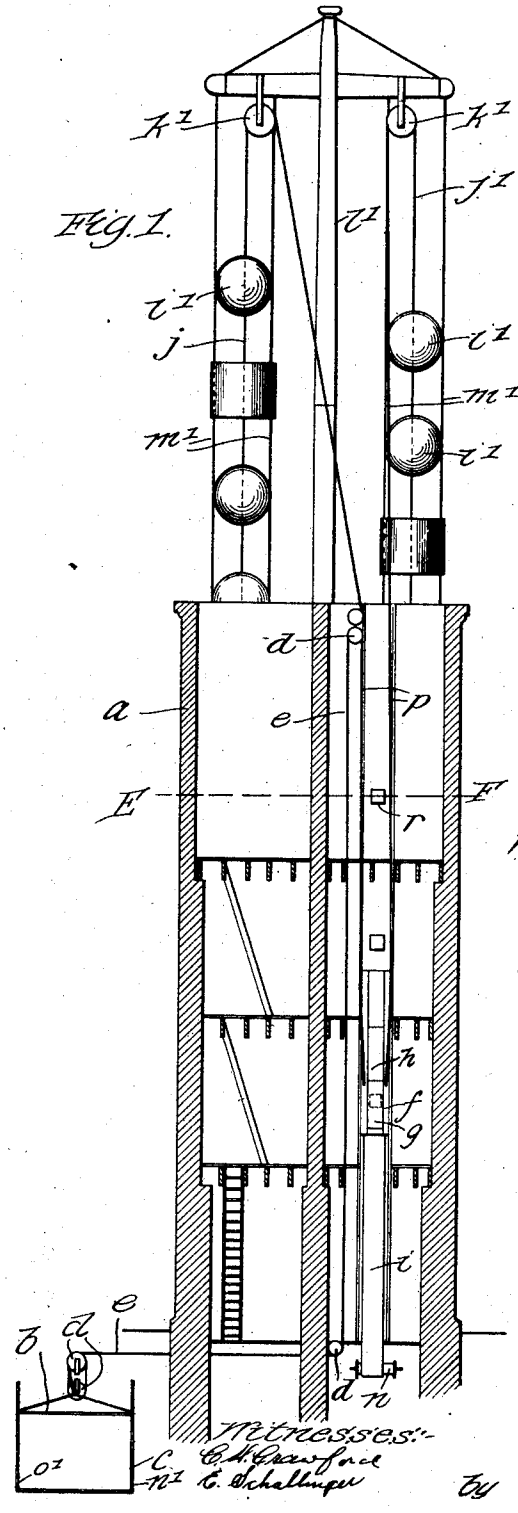


Fig. 2.

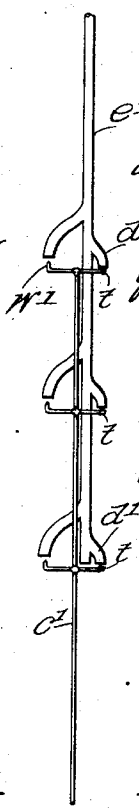
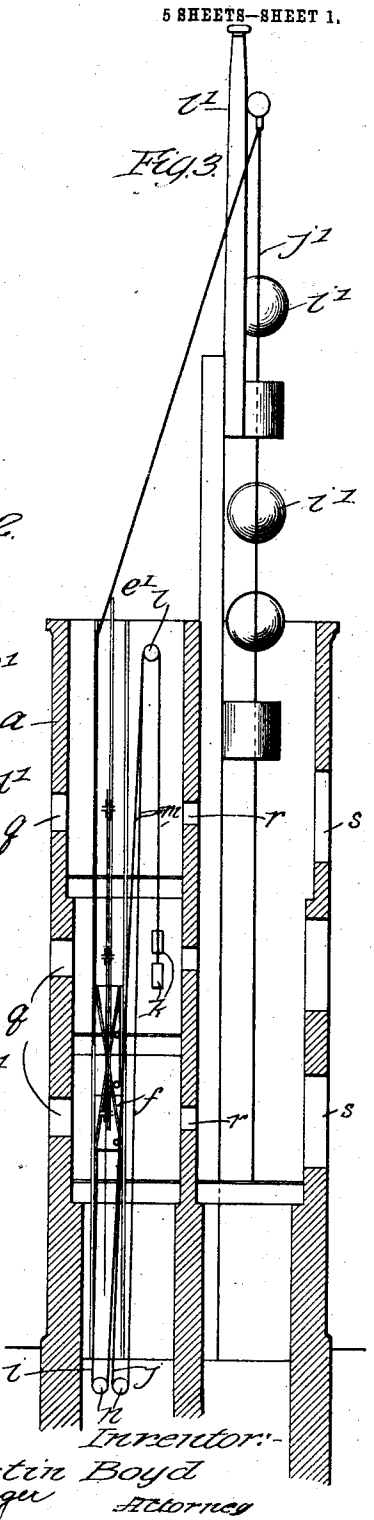


Fig. 3.



Witnesses:-
C. H. Crawford
C. E. Schellinger

Inventor:-
Martin Boyd
by B. Singer
Attorney

THE NORRIS PETERS CO., WASHINGTON, D. C.

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5 SHEETS—SHEET 2.

Fig. 4.

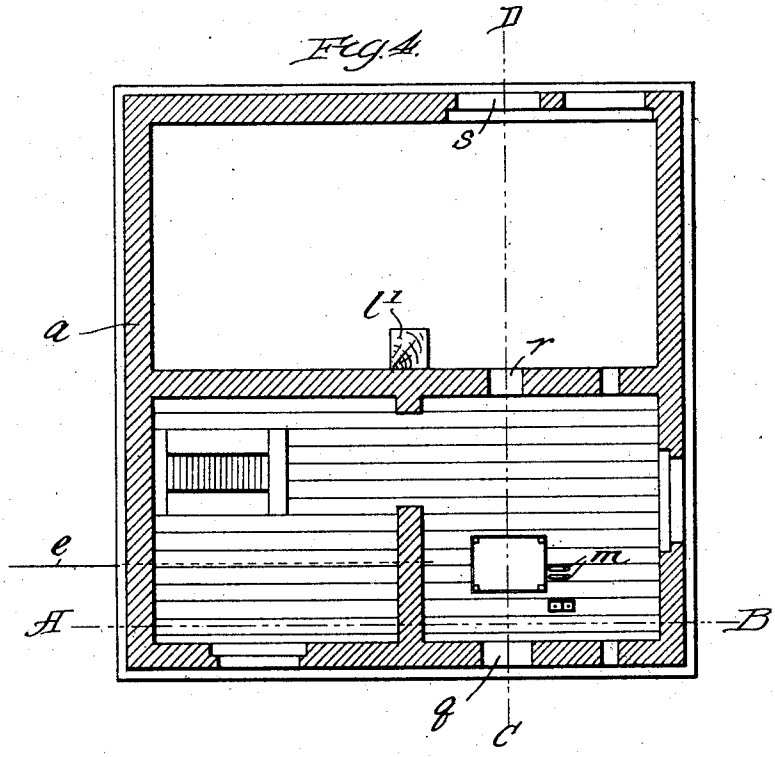


Fig. 5.

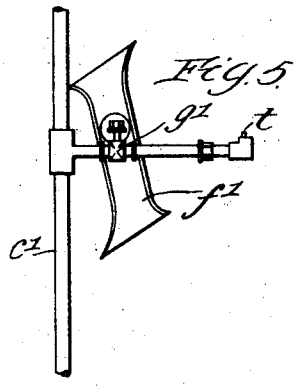
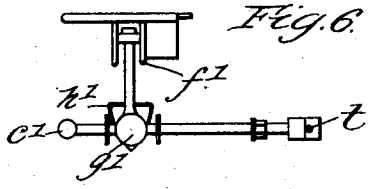


Fig. 6.



Witnesses:-

C. M. Crawford

E. Schallinger

Inventor:-

Martin Boyd

by B. Singer

Attorney

THE NORRIS PETERS CO., WASHINGTON, D. C.

M. BOYD.

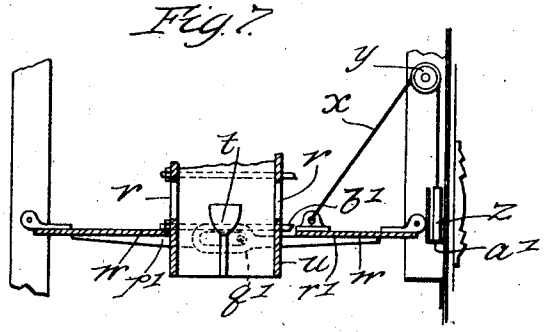
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5 SHEETS—SHEET 3.

Fig. 7.



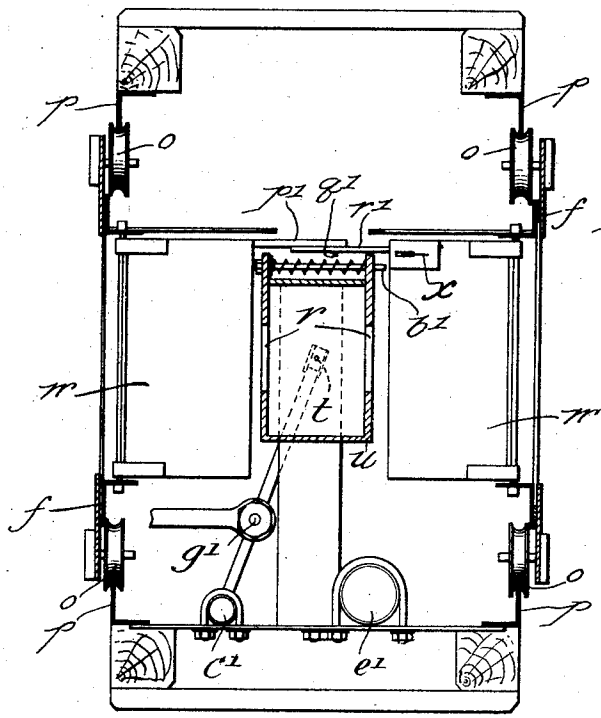


Fig. 8.

Witnesses:-
C. H. Crawford
E. Schallinger

Inventor:-
Martin Boyd
by B. Singer
Attorney

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5 SHEETS-SHEET 4.

Fig. 9.

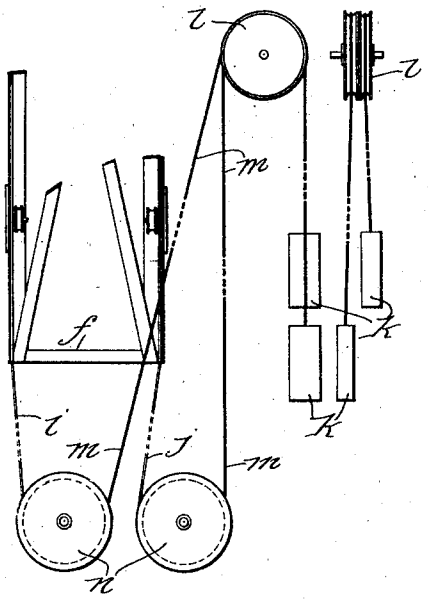
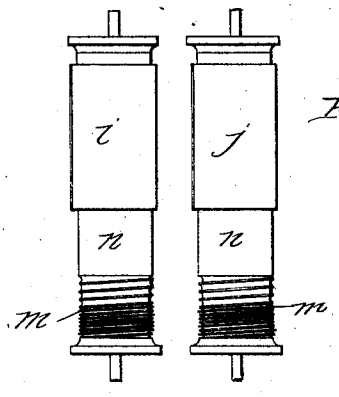


Fig. 10.



Witnesses:-

C. M. Crawford

C. Schallinger

Inventor:-

Martin Boyd

by B. Singer

Attorney

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M. BOYD.

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5 SHEETS—SHEET 5.

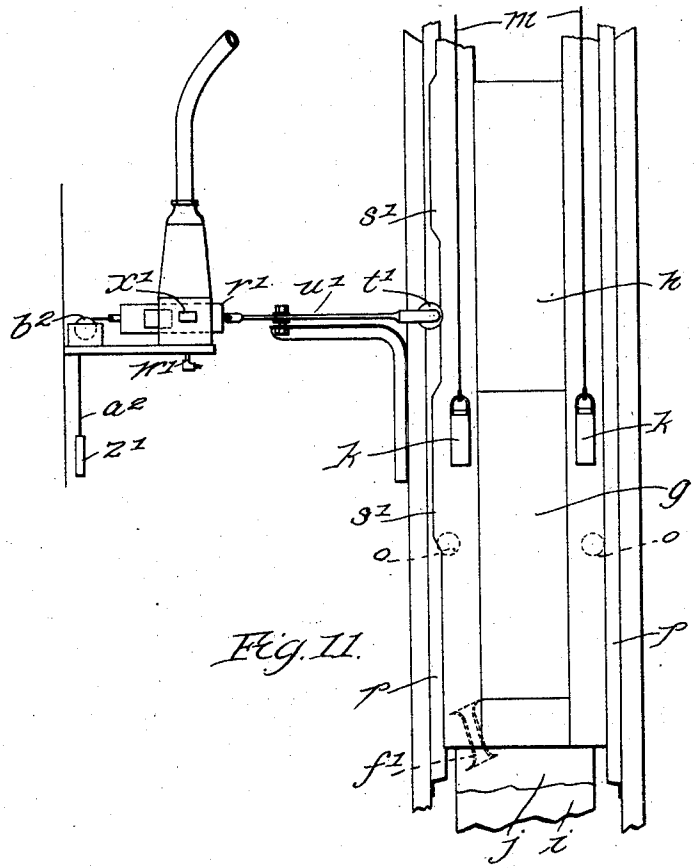


Fig. 11.

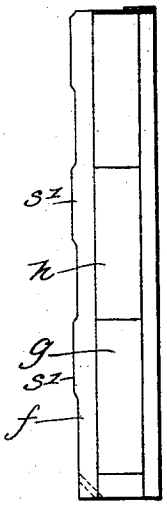


Fig. 11a

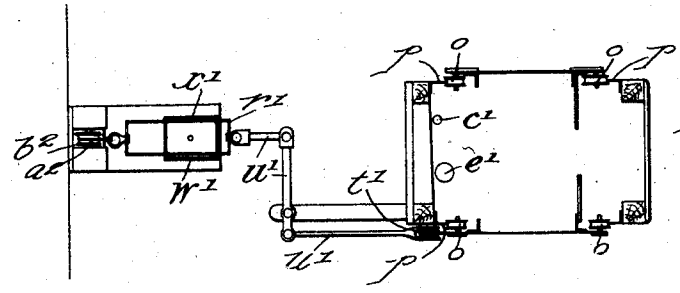


Fig. 12.

Witnesses:-
C. H. Crawford
E. Schallinger

Inventor:-
Martin Boyd
by B. Singer
Attorney

THE NORRIS PETERS CO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

MARTIN BOYD, OF IRVINE, SCOTLAND.

MARINE SIGNALING DEVICE.

No. 901,677. Specification of Letters Patent. Patented Oct. 20, 1908.

Application filed July 24, 1905. Serial No. 271,022.

To all whom it may concern:

Be it known that I, MARTIN BOYD, of 56 Harbour street, Irvine, in the county of Ayr, Scotland, harbor-master, have invented certain new and useful Improvements in Marine Signaling Devices, of which the following is a specification.

My invention relates to an apparatus which is actuated by the rise or fall of the tide or water level by means of a float connected to the apparatus thereby causing it to automatically exhibit a code of light signals by night and a code of balls or the like signals by day.

In order that my invention may be properly understood and readily carried into effect, I have hereunto appended five sheets of drawings in which corresponding parts are marked with the same letters of reference.

Figure 1 is a section of the apparatus taken through the line A B of Fig. 4. Fig. 2 shows the gas pipe, jets and ventilation pipe hereinafter described. Fig. 3 is a section of the apparatus taken through the line C D of Fig. 4. Fig. 4 is a horizontal section of the brick tower taken through the line E F of Fig. 1. Fig. 5 is an elevation of the inclined slot and gear for raising and lowering the jets hereinafter described. Fig. 6 is a plan of the gas burner, gas cock, and inclined slot. Fig. 7 is a sectional elevation of the instantaneous alterers of the colors of the lights hereinafter described. Fig. 8 is a sectional plan on an enlarged scale of the frame *f* of the colored glass slides. Fig. 9 is an elevation of the rollers *n* and the eclipsers *i* and *j* showing the attachment of eclipsers to the frame *f*. It also shows how the eclipsers are rolled up by means of the weights *k* attached to the wire ropes *m* passing round the pulleys *l* fixed at the top of the tower. Fig. 10 is a plan of the rollers for the eclipsers. Fig. 11 is an elevation of the colored glass frames *f* showing half foot lights mechanism. Figure 11ª shows entire elevation of colored glass frame. Fig. 12 is a plan of the colored glass frame and mechanism for showing foot lights.

The apparatus is inclosed in the tower *a*. The float *b* rises and falls by the action of the tide or change of water level in the well *c* placed either directly under the tower or at any convenient distance therefrom according as the local circumstances permit. The vertical motion of the float *b* is transmitted by suitable gearing in this case by means of the pulleys *d* and the rope or chain *e* thus connecting the float *b* to the frames *f* of the colored glass slides *g* and *h*. Flexible eclipsers *i* and *j* made of asbestos wire cloth or other suitable material are attached to the lower ends of the said frames *f*. When the float *b* rises, the colored slides *g*, *h*, therefore fall and the flexible eclipsers are, by means of the weights *k*, pulleys *l*, and the cords *m*, rolled up on the rollers *n* placed at the lower end of the tower. On the tide falling, the float *b* hauls up the colored slides *g* and *h* and unrolls the flexible eclipsers *i* and *j*. The motion of the colored slides *g* and *h* and eclipsers *i* and *j* are guided in their travel by grooved wheels *o* running in suitable paths *p* fixed within the tower, as seen more particularly in Fig. 8. The object of the flexible rolling up eclipsers *i* and *j* is to permit the reducing of the height of the tower to a minimum.

When the float *b* is at zero or low water level the colored slides *g* and *h* are then up near the top of the tower *a* and the front eclipser *i* covers all the front apertures *q* through which the lights are to be seen seawards or the direction in which the signals are to be shown. The back eclipser *j* in like manner obscures all the apertures *r* and *s* through which the lights are to be seen as tell tale lights landwards, and are placed at whatever angle from the seawards lights so as to suit the local circumstances. When the tide or water level rises one foot (or other measurements as arranged) above the low water level, or the zero point at which the first signal is set to appear, the eclipsers *i* and *j* pass down and uncover the uppermost of the apertures *q* and simultaneously bring the green slide *g* between the burner *t* and the aperture *q* thus showing a green light. At the second foot of rise of tide or water level the green slide *g* passes down to near the level of the burners *t* and simultaneously brings on the red slide *b* and shows a red light. At the third foot of rise the red slide *b* passes down to below the level of the burner *t* which now shows a white light. At the fourth foot of rise the eclipser uncovers the second aperture and simultaneously brings the green slide *g* between it and its corresponding burner, thus showing a green light below the white light.

At the fifth foot of rise the green light changes to a red light. At the sixth foot of rise the red light changes to a white light. At the seventh foot of rise a green light appears below the two white lights, and so in like manner as already described until as many lights are shown as is necessary to indicate the depth of water, or height to which the tide or water level has risen. When the lights change to white they remain white until, on the ebbing tide, the water has again fallen below the point at which they became white. The frame of the back has colored slides. The tell tale lights are therefore shown simultaneously with the seawards lights. On the falling tide the colored slides and eclipsers act vice versa changing the colors and eclipsing the lights one by one until all, or as many lights, have changed color or are eclipsed, as is necessary to indicate the depth or level to which the tide or water level has fallen.

The front apertures q may, if desired, be fitted with lenses of suitable power according to the distance at which the lights require to be seen.

The burners t, more particularly seen in Figs. 7 and 8 are placed within the flame screens u which only permit the light to pass through the apertures v. The instantaneous alterers w consist of a plate hinged to the frame of the colored glass slides exactly on the line between each of the different colors. The plates on the front frame are hung by the cords or chains x which pass over the pulleys y fixed to the said frame and attached to the weights z which rest on the brackets a' also fixed to the said frame. The weights z being heavier than the plates the latter are held at the horizontal. When the colored slides g and h are passing down, the hinged plates w come in contact with the projections b', on the flame screens u and are slightly tilted upwards and prevent the rays of the light from striking on the approaching slide when coming near the point at which the color alters, thus preventing two colors being visible through the lens at the same time and entirely obviating blurring or blending of the colors into each other, or showing a light of indistinct color. When the hinged edges of the plates w pass down to a little below the level of the center of the apertues v, the plates become relieved from the projections b' and, by their own weight, fall to the horizontal, allowing the rays of the light to strike on the approaching slide, and preventing the rays from striking the receding slide, thus instantaneously and distinctly altering the color of the lights. On the upward travel of the colored slides g and h, the alterers w act in a similar manner and coming in contact with the lower projections b' on the flame screens u, they are slightly tilted downwards by lifting the weights z and when relieved the weights z bring them instantaneously back to the horizontal.

A projecting arm r' on the front alterers w having a fork or slot engages with a horizontal pin q' on the arm p' of the back alterers w. The latter are thereby operated by the motion of the front alterers, thus instantaneously altering the colors of the tell tale lights simultaneously with the seaward lights. The instantaneous alterers w also act in like manner on the opening and eclipsing of the lights causing instantaneous opening and eclipsing. The source of light in this case is gas supplied by the pipe c' to burners t, see Fig. 2. The fumes of combustion are caught by the cups d' and carried off by the ventilator pipe e' which is connected to the open air at the top of the tower. On the lower end of the frame f of the front colored glass slides is fixed an inclined slot f' Figs. 5, 6 and 11, which in its vertical travel grips projecting handles of gas cocks g' in the downward travel turns on the gas to each jet before the corresponding aperture has been uncovered by the eclipser, and in upward travel shuts off the gas at each jet after the corresponding aperture has been eclipsed. A by-pass h' in the cocks g' allows sufficient gas to pass to keep the jets always burning. The slot f' is provided with wings to insure the handles of the gas cocks g' being gripped although accidentally left out of position.

I do not wish to be limited to the specific form of means for providing light.

For day signals large figures i' are used. These figures are connected together at fixed intervals on the ropes j', which pass over the pulleys k', on the cross arm of the flagstaff l' and are connected to the frames of the colored glass slides, so that when the latter fall the figures rise and vice versa. The figures are guided in their travel by jack stays m'. When the tide rises one foot above the low water level or the zero point at which the first of the night light signals is set to appear, the first figure corresponding to the available depth of water appears above the tower. At the second foot of rise the next fixture appears and so on. The figures thus form a gage, the bottom figure always corresponding to the depths of water. On the ebb tide, the figures, one by one, at each foot of fall of the water level disappear within the tower.

The balls or the like on which the figures are shown form a code of distant signals when viewed at a distance greater than that from which figures can be easily read. One ball appears above the tower at each foot of rise of the tide and so on until as many balls are visible as is necessary to indicate the depth or height to which the water level has risen. On the ebb tide one ball disappears

within the tower at each foot of fall of the water level and so on until all or as many balls have disappeared as is necessary to indicate the depth or level to which the tide has fallen. To facilitate the rapid reckoning of the available depth of water and to correspond with the white lights of the night signals every third signal may be cylindric or other like shape.

When desired to show the rise or fall of every half foot the mechanism referred to in Figs. 11 and 12 is employed which comprises cams, or projecting pieces s' which are fixed to or formed on the side of the frame f of either the front or back colored slides g and h. When the water level has risen half a foot above the level indicated by each of the lights hereinbefore described, the cam comes in contact with the roller t' and operates the lever and connecting rod mechanism u' and withdraws the eclipser v' from between the burner w' and the aperture x' thus showing a small light at the side of the main light. When the water level has risen to the beginning of the next foot the cam has passed clear of the roller t' and the light is obscured by the eclipser being again brought back between the burner w' and the aperture x' by means of a spring or as in this case as shown by the weight z', cord a^2 and pulley b^2.

On the following tide the mechanism acts vice versa showing the light during the first half of the foot and eclipsing it during the last half.

To prevent oscillation of the float in cases where the well is exposed to high waves or a heavy swell, the area of the inlet n' is regulated so that the level of the water in the well cannot rise much faster than at the rate of rise of the highest spring tide in the locality, thus reducing the vertical oscillation of the float to an almost imperceptible degree. To provide against the possibility of the water in the well under any abnormal circumstances standing slightly above the mean level of the water outside; a relief c' is fitted which only opens by pressure from within the well.

I claim—

1. A signaling device comprising in combination, a tower having a plurality of signaling openings, lighting means adjacent said openings, movable means traveling abreast of said openings and lighting means and provided with different colored elements coöperating with said lighting means to produce signal lights of different colors, and means for preventing the blending of colors of the signal lights.

2. A signaling device comprising in combination, a tower having a plurality of signaling openings, lighting means adjacent said openings, movable means traveling abreast of said openings and lighting means and provided with different colored elements coöperating with said lighting means to produce signal lights of different colors, and means carried by said movable means for preventing the blending of colors of said signal lights.

3. A signaling device comprising in combination, a tower having a plurality of signaling openings, lighting means adjacent said openings, movable means traveling abreast of said openings and lighting means and provided with different colored elements coöperating with said lighting means to produce signal lights of different colors, a plate pivotally mounted on said movable means, and stationary elements for actuating said plate to prevent the blending of colors of the signal lights.

4. A signaling device comprising in combination, a tower having a plurality of signaling openings, lighting means adjacent said openings, movable means traveling abreast of said openings and lighting means and provided with different colored elements coöperating with said lighting means to produce signal lights of different colors, a weight actuated and gravity acting plate pivotally mounted on said movable means, and stationary elements for operating said plate to prevent the blending of colors of the signal lights.

5. A signaling device comprising in combination, a tower having a plurality of signaling openings, lighting means adjacent said openings, said openings being disposed in a manner to expose signal lights seawards and landwards, movable means traveling abreast of said openings and lighting means and provided with different colored elements coöperating with said lighting means to produce signal lights of different colors seawards and landwards, a gravity acting weight actuated plate pivotally mounted on said movable means to prevent the blending of colors of the seaward signal lights, a plate pivotally mounted on said movable means and operatively associated with said first mentioned plate for preventing the blending of colors of the landward signal lights, and stationary elements for operating said seaward plate.

In witness whereof I have hereunto set my hand in the presence of two witnesses.

MARTIN BOYD.

Witnesses:

JOHN LIDDLE,

JOSEPH HENRY PEARSON.