

No. 121,561.

Fig: 2.

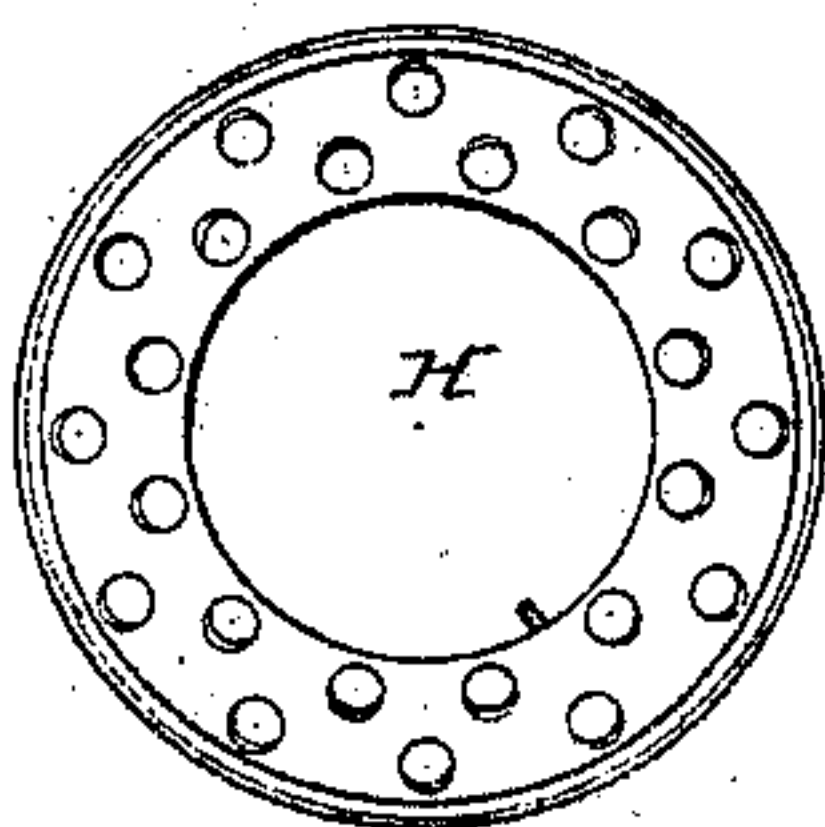
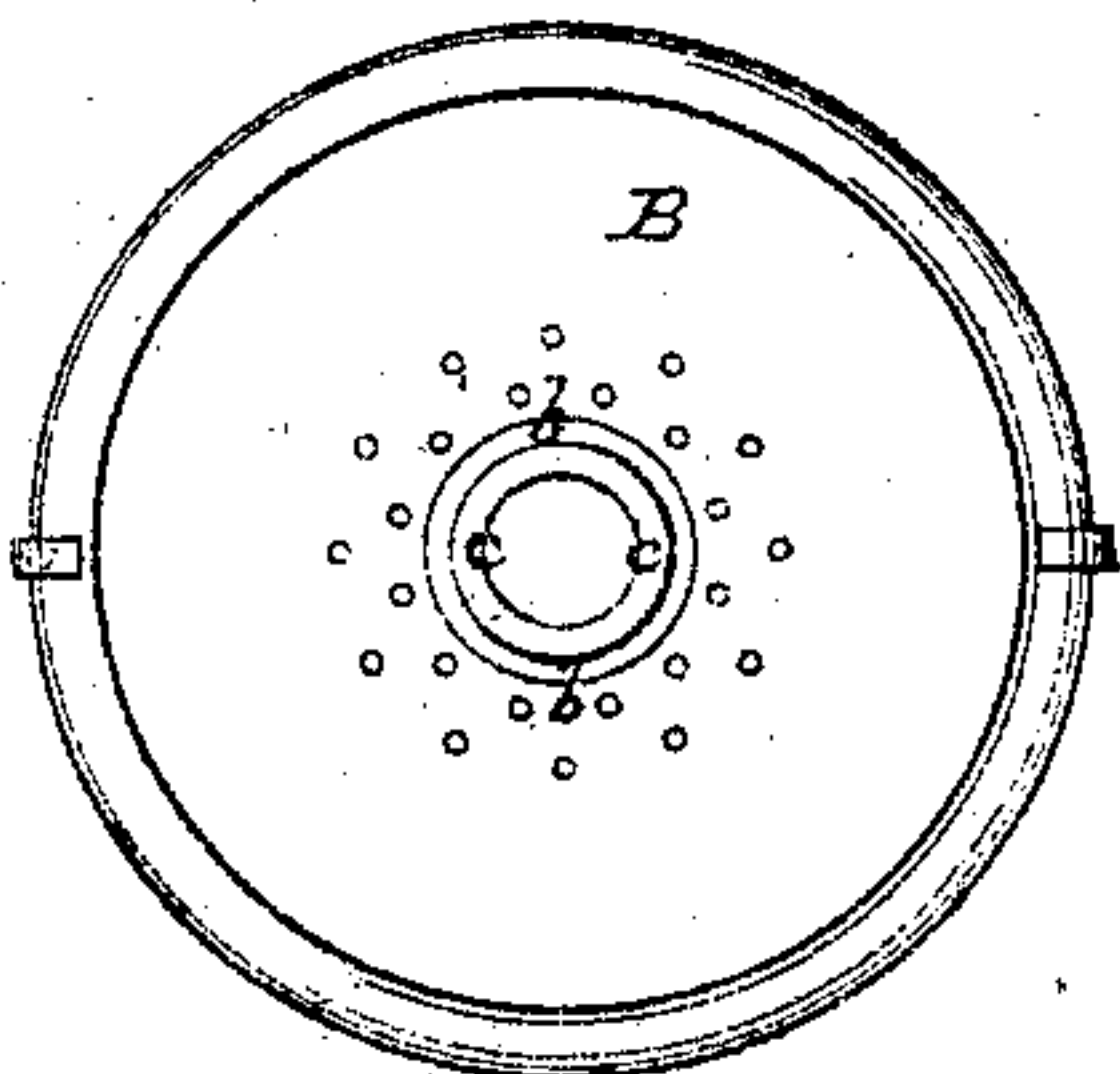


Fig: 3.



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The numerals by White Light									
●	○	○	○	○	●	○	○	○	○
●	○	○	○	○	○	●	○	○	○
●	○	○	○	○	○	○	○	○	○
○	○	○	○	○	○	○	○	○	○
1	2	3	4	5	6	7	8	9	0

Fig: 6

The numerals by white and grey										Numerical Signification
○	○	○	●	○	○	○	○	○	○	
1	2	3	4	5	6	7	8	9	0	

Fig: 7

Answers				
YES	NO	Repeat	Distress	

Fig: 8.

[illegible]

Fig: 9.

A	1
B	2
C	3
D	4
E	5
F	6
G	7
H	1 2
I	1 3
J	1 4
K	1 5
L	1 6
M	2 1
N	2 2
O	2 3
P	2 4
Q	2 5
R	3 1
S	3 2
T	3 3
U	3 4
V	4 1
W	4 2
X	4 3
Y	5 1
Z	5 2
&	6 1

Fig.  
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1	1	2	1
2	1	2	2
3	1	2	3
4	1	2	4
5	1	3	1
6	1	3	2
7	1	3	3
8	1	4	1
9	1	4	2
0	1	5	1



# UNITED STATES PATENT OFFICE.

WILLIAM HENRY WARD, OF AUBURN, NEW YORK.

## IMPROVEMENT IN TELEGRAPH-SIGNALS.

Specification forming part of Letters Patent No. 121,561, dated December 5, 1871.

*To all whom it may concern:*

Be it known that I, WILLIAM HENRY WARD, of Auburn, in the county of Cayuga and State of New York, have invented a new and Improved Day, Night, and Fog-Signal Telegraph and appliances therefor, of which the following is a specification:

My invention relates to a system for signal-telegraphing by day, night, and during fogs, on land and at sea; and the said system consists of indicating the alphabet, numbers, or other signs by means of raising or lowering a working flag or light to or from a stationary flag or light arranged in the same vertical line with the working one, whereby a continuous signaling can be done without being obliged to make different arrangement of different-colored flags or lights for each distinctive letter, number, or other sign, while the motion of a working flag or light relatively to a stationary one can be seen at a greater distance with more positive certainty than the colors of flags or lights arranged closely to each other could be distinguished from each other. My invention further consists in the construction and arrangement of the signal-lantern used for night-signaling, as will be more fully described hereinafter.

In the accompanying drawing, Figure 1 represents a vertical section of a lantern used in connection with my night-signal telegraph. Fig. 2 represents an inverted view of the perforated cap of the lantern. Fig. 3 represents a top view of the bottom of the lantern, which forms the candle-stand. Fig. 4 represents the means for day-signal telegraphing. Fig. 5 represents the manner of suspending and operating the lanterns for night-signal telegraphing. Fig. 6 represents the numerals as signified by five white lights. Fig. 7 represents the numerals as signified by three lanterns showing white and red lights. Fig. 8 represents five standing significations or distinct signals, signified by red lights. Fig. 9 represents the standing alphabet, signified by the use of white and red lights; and Fig. 10 represents the alphabet and numerals, signified by the dip of the flag by day, the obscuring of the light by night, and distinct sounds during fogs.

In using the lanterns they are suspended by halyards to the gaff-arm or other convenient parts of the ship where they can be distinctly seen. They are arranged vertically one above the other, and sustained in position at suitable distances

one from the other, so as to give range and distinctness to the signal.

The lantern consists of a case, *a*, open at both ends, the upper end of which is curved inward to form a seat for the outer magnifying-glass or lens *A*, while the lower end is closed by the base *B*, or candle-stand, which forms the bottom of said case. This bottom has a chamber, *D*, formed on its under side, with perforations therein, and also in the bottom *B* for the admission of cold air into said chamber *D*, and from them into the lantern to supply the burner. The object of this chamber is to destroy the force of outer blasts of wind, preserve the steadiness of the light, and prevent its extinguishment. The bottom *B* is provided with a short tube, *b*, for the reception of the candle-tube *c*, and to which it is connected by the ordinary bayonet-fastening. The candle-tube *c* is provided with a spiral spring, *E*, to force the candle up as it burns away. The lens *A* is of the Fresnel kind, to give range and distinctness to the light. The dome *F*, with its chimney *G*, is made of one piece of sheet metal, known as spun-work, thereby avoiding all seams and solder. Its base has an inward incline, *c'*, to form a seat for the dome upon the lens *A*, and the lens thus placed between the case *a* and dome *F* is secured in position with these parts by means of screw-rods *f* connected to brackets *d* and *e* secured to the case and dome, and by which the said parts of the lantern are securely held together. The cap *H* of the dome is fitted upon and secured to the chimney by the usual bayonet-fastening, which admits of its ready removal for lighting and extinguishing the light, and to facilitate the cleansing of the lantern. It is formed of spun-work, and made with an upper chamber, *g*, by means of an inner semicircular lining, *h*, the object of which chamber is to keep the cap cool, and the latter, for this purpose, is perforated so as to allow the cold air to circulate within said chamber. The neck *G* of the dome is provided with a flange, *s*, which curves upward, outward, and slightly downward, so as to form a curved guard, against which the blast impinges, is directed, and forced out at leeward. The colored cylinder-glass *J* is arranged within the lantern in such manner as to admit of being raised and lowered at pleasure by securing said glass cylinder *J* between annular plates *i*, which are fitted to move upon vertical guide-rods *j* supported by brackets *k* attached to



the inner sides of the case *a* and dome *F*, and which serve to limit both the ascent and descent of the colored glass within the lantern, as shown in Fig. 1. This glass may be of one or more colors having the greatest distinctness and range, and is operated by attaching a chain, *l*, thereto, passing over a pulley, *m*, secured to the side of the dome *F*, and having a ring, *n*, to which a small line is attached extending within reach of and controlled by the operator, as shown in Fig. 5, enabling him to raise and lower the colored-glass cylinder to envelop and change the color of the light from white to that of the cylinder within. In addition to the within colored-glass cylinder, an outer screen-envelope, *K*, is arranged to slide upon the outer vertical rods *f* by means of a chain or cord, *o*, extending also to and controlled by the said operator. The lantern thus constructed is provided within an upper and lower bail, *L*, by which it is suspended between the guy-lines *M*, Fig. 5.

It will be seen, by reference to Fig. 5 of the drawing, that the operator has control of the outer screen-envelopes and the inner colored-glass cylinders, enabling him to obscure any one or more of the lights or change their color from white to that of the cylinder within at pleasure, forming combinations indicating the numerals and letters of the alphabet, as shown at Figs. 6, 7, and 9 of the drawing, which constitutes the night-signal telegraph.

By this arrangement and operation of the lantern I am enabled to gain a great advantage in the simplicity and certainty with which night-signals will be understood; for by arranging several of these lanterns one above the other and allowing one or any desired number of them to act as stationary lights, while the rest or a single one may be used as working-lanterns; and thus not only will the lights of the stationary lanterns by their relative position to the working-light or lights afford one or more positive points from which to determine the change in color or the total eclipse of the working-light, but the relative position of the working to the stationary lights may be changed instantly without lowering the lanterns and changing their relative positions above each other, as any and either of them, by reason of their separately-operated obscuring or coloring slides, can be made to act as stationary or as working lights.

To represent the numerals, as shown in Fig. 6, five lanterns are vertically arranged one above another, as shown in Fig. 5, showing white lights only, and are used for long ranges out of the distinct vision of a colored light, in which the operator does not move the colored glasses within, but uses the outer screen-envelopes in such manner as to form combinations corresponding to the table shown in Fig. 6 in the following manner—that is to say, one white light indicates 1; two white lights, 2; and so on up to 4 in succession, while 5 is indicated by one white light, one space or obscured light, and two white lights. 6 is indicated by a white light, space, and three white lights. 7 is the reverse of 5. 8 is indicated by the center light of the five being obscured. 9

is the reverse of 6; and the cipher is represented by exhibiting all the five lights, which system is designated from the others by showing and obscuring the said five white lights simultaneously by the operator taking hold of and pulling the obscuration-work lines at one pull for a few times in working succession, signifying to the signaled parties that a numerical message is to be signaled by white lights exclusively.

To indicate the numerals from 1 to 0 by white and colored lights three lanterns are only required, corresponding to the table shown in Fig. 7, the shaded spots in which indicate colored lights, and are exhibited and operated in a manner corresponding to that already described in illustrating the table shown in Fig. 6.

To indicate letters of the alphabet, four lanterns are used in corresponding manner to that above described; and to signify when such alphabet is to be used four white lights are shown and obscured a few times in succession, indicating a message by spelling.

The table shown in Fig. 10 is used in connection with a flag, shown in Fig. 4, for day; and one lantern, which may be used between two fixed lights, if necessary, so as to keep range, for night. It is also used with any means at hand for making distinct sounds during fogs in the following manner—that is to say, the first seven dips of the flag, or obscurations of the light, or distinct sounds, indicate the first seven letters of the alphabet; thus, one is A; 2 is B; three, C; four, D; five, E; six, F; and seven is G. The remaining letters of the alphabet are indicated by the double-column changes, and in no case exceeding the seven dips for any one letter, viz.: One and two is H; one and three, I; one and four, J; one and five, K; one and six, L; two and one, M; two and two, N; two and three, O; two and four, P; two and five, Q; three and one, R; three and two, S; three and three, T; three and four, U; four and one, V; four and two, W; four and three, X; five and one, Y; five and two, Z; and six and one is &. The numerals are no less significant in the order of triple-column division, as follows, viz.: One, two, one is 1; one, two, two, 2; one, two, three, 3; one, two, four, 4; one, three, one, 5; one, three, two, 6; one, three, three, 7; one, four, one, 8; one, four, two, 9; and one, five, one is 0; absorbing all the changes that can be effected by having 1 in the first column, as shown in Fig. 10.

To telegraph by the table in Fig. 10, for example, to indicate the letters A O B, by day, for long ranges, one stationary flag, *P*, is hoisted by an independent halyard, and also a work-flag, *Q*, is hoisted by another halyard in such manner as to allow of considerable slack, as shown at *R*, Fig. 4, so that by the operator letting go the slack of the line the flag *Q* is separated from the flag *P*, which movement is termed a dip. Then by hoisting the flag *Q* up to its position with flag *P*, as shown, and then letting go again to dip, indicates the letter A, at which point the flag rests a little. The operator then repeats this movement twice in quick succession, and then waits a little and repeats the same movements



three times in quick succession, allowing the flag to rest at dip for the usual wait-time between letters of the alphabet, signifying O, as will be seen by the table, Fig. 10; when he again repeats the operation twice in quick succession, and running the flag up in position and holding it there, signifying that the signal is finished, thus indicating the letter B, which said signaled letters when put together indicate A O B, which signifies "all on board."

The obscuration of the light corresponding to that of the dip in the flag will indicate the same system for signals for night; and by distinct sounds the same system is rendered intelligible for signaling during fogs.

The great advantage of my improved system is its great simplicity and the consequent rapidity with which signals can be made and read; no hauling down of flags and lanterns to change their relative positions to indicate different numerals being necessary, but the signals being made without stopping by merely operating the halyards of the working flag or of the working lantern-slides.

Although more than two flags or lights may be used, only two are necessary—that is to say, a stationary and a working one. The system of electric-telegraph signals can, therefore, be well applied by my invention, the long and short

stops or clicks of the latter being in my system indicated by the quick or slow operation of the flag and the intervals between the obscuring of the working light.

Having described my invention, I claim—

1. The herein-described system of signaling by means of two flags, lights, or their equivalents, one of which is stationary while the other is a working one, the signals being indicated by the relative movement of the latter toward the former, as set forth.

2. In the above-described system of signaling, lanterns so constructed each with its separate slides and operating halyards, that, when permanently arranged above each other in a vertical line, either and all of them may be changed from one spot and by the same operator to stationary or working lanterns, as and for the purpose described.

3. In signal-lanterns, the chamber D at the bottom and chamber g at the dome, substantially as and for the purpose described.

4. In combination with the chamber g, the curved flange s, acting as a draught-deflector, substantially as described.

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