(No Model.)

L. I. BLAKE.

SUBMARINE SIGNALING.

No. 524,239. Patented Aug. 7, 1894.

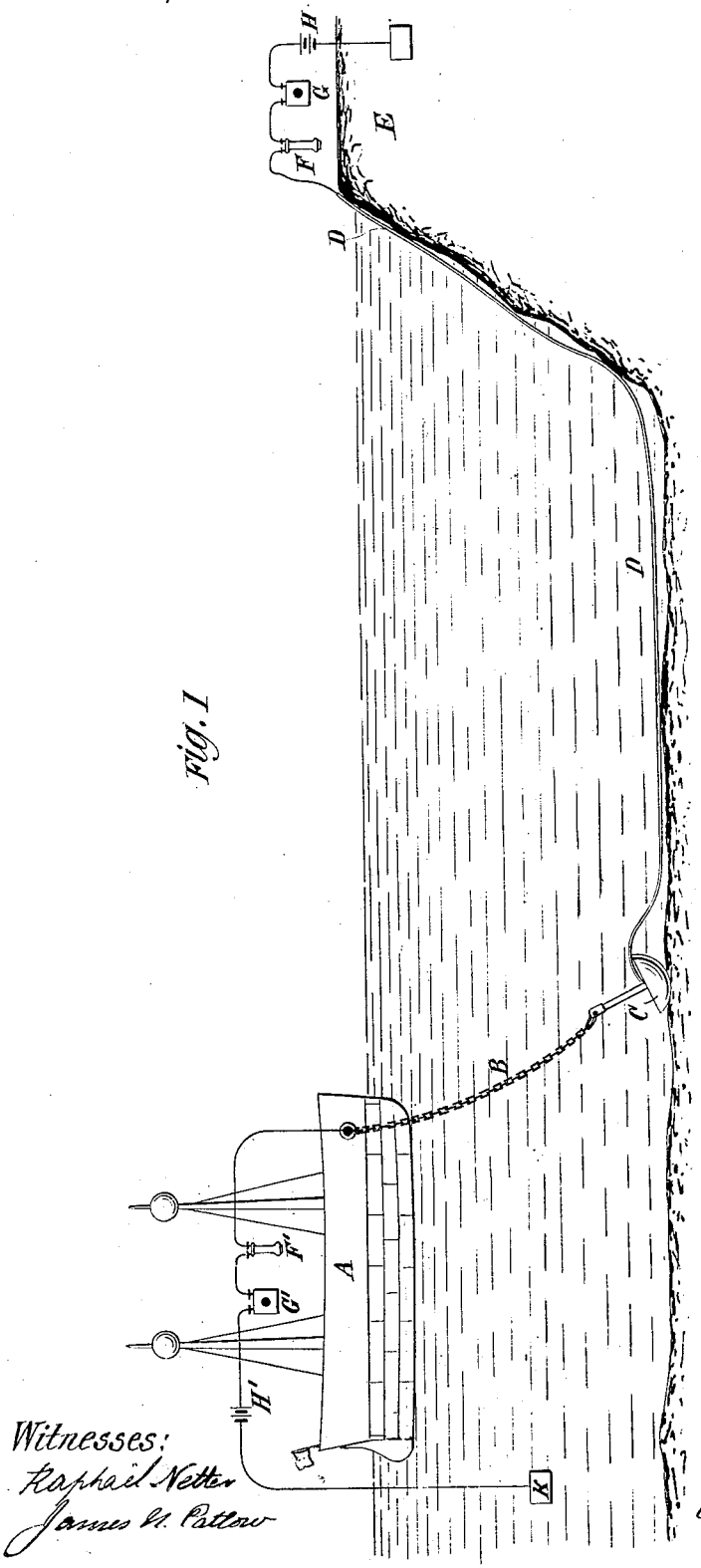

Fig. 1

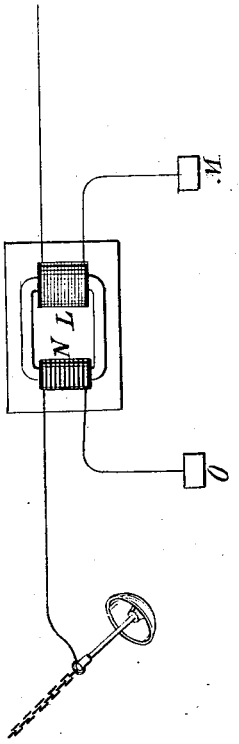

Fig. 2

Witnesses:
Raphael Netter
James M. Patterson

Inventor
Lucien I. Blake
by Duncan & Page
Att'y

UNITED STATES PATENT OFFICE.

LUCIEN I. BLAKE, OF LAWRENCE, KANSAS.

SUBMARINE SIGNALING.

SPECIFICATION forming part of Letters Patent No. 524,239, dated August 7, 1894.

Application filed December 22, 1893. Serial No. 494,424. (No model.)

To all whom it may concern:

Be it known that I, LUCIEN I. BLAKE, a citizen of the United States, residing at Lawrence, in the county of Douglas and State of Kansas, have invented certain new and useful Improvements in Submarine Signaling, of which the following is a specification, reference being had to the drawings accompanying and forming a part of the same.

The invention which forms the subject of my present application is a method or system of electric communication more particularly designed for transmitting intelligence between the shore and a light ship or other vessels which is permanently anchored beyond speaking distance from the land. The practical difficulties in maintaining telegraphic or telephonic communication between such ships and the shore by the use of submarine cables laid from the shore and brought up from the bottom to the ship have been found too serious to permit of their adoption. However well protected the cable may be, the constant motion of the ship produced by wind and tide, and the consequent twisting, chafing and straining of the cables and their liability to foul with the anchor chain destroy or render them useless in a very short time.

My purpose is to dispense with the suspended portion of the insulated or protected cable, or that extending from the bottom up to the ship, and which is the only part of the cable that is especially liable to injury, and one of the ways in which I have accomplished this and still succeeded in maintaining perfect telephonic communication with the ship is by utilizing the anchor and chain as a part of the metallic circuit.

I have carried out my invention in the following manner: An insulated cable was laid from the shore to a point near a lightship where its core was electrically connected with the anchor of the ship. The anchor chain was in metallic connection with the sheathing of the vessel at the hawse pipe through which it passed. Between the sheathing of the ship and a submerged plate held at a short distance from the ship's side a metallic circuit was established through a wire to which was connected a telephonic transmitter and a receiver of very low resistance. Similar instruments were connected with the shore end of the insulated cable, and batteries provided for the transmitters. With this arrangement perfectly clear speech was transmitted both from the shore and from the ship through a very considerable length of intermediate cable.

This plan, as described, may be modified in various ways without material change in the result. For example, a transformer which converts from high to low potential may be introduced between the cable and the anchor, the low resistance coil of the transformer having one pole to ground and the other to the anchor, while the high resistance coil may have its ends connected with the conductors of a double cored cable, respectively, or one end to ground and the other to the cable core. Also, the anchor chain may be insulated from the ship's sheathing, and in that case the sheathing of the vessel may serve as the submerged plate.

The accompanying drawings will serve as an illustration of the manner in which the invention is or may be carried into effect.

Figure 1 is a view showing the general relations of the ship, the shore and the signaling apparatus. Fig. 2 is a diagram illustrating the manner of using a transformer.

A designates any permanently anchored vessel such as a lightship.

B is the chain and C the anchor.

D is an insulated cable running from the shore E and having its core electrically connected with the anchor, or with the chain close to it.

At the shore station, and on board the ship are telephonic receivers F, F′, transmitters G G′ and transmitting batteries H, H′. The above named instruments at the shore end are connected with the cable circuit in the usual manner, while those on the ship are in a circuit from the ship's sheathing or the anchor chain to a submerged plate K, which is let down over the ship side or suspended in the water in any convenient way; or the ship's circuit may be from the anchor-chain to the sheathing, if these are properly insulated from each other.

In lieu of connecting the cable directly to the anchor, the transformer, shown in Fig. 2, may be introduced between them. This transformer has a high resistance coil, L, of which

one terminal is connected with the insulated core of the cable while the other ends in a plate M lying on the bottom. The low resistance coil N has one terminal connected with a plate O lying on the bottom and the other connected with the anchor.

In practice I have found it desirable to employ on the ship a telephone of exceedingly low electrical resistance, and it is desirable to maintain between the links of the chain as good electrical contact as possible. For this purpose it is preferable to employ chains of non-corroding metal, such being now obtainable in the market.

I have described the system as applied to a permanently anchored lightship, but it is obvious that it may be applied to other analogous purposes, as for instance for maintaining communication between the shore and an isolated lighthouse built upon either a natural or an artificial foundation and to which a cable connection is rendered difficult by exposure to the action of the waves, drift ice or the like. In such case an insulated cable carried from the shore to the light house would be liable to chafe and wear out against the rocks. By my present invention, a heavy conducting chain would be carried from the light house down to the bottom of the adjacent water, where it might be anchored in any suitable way; the end of the cable from shore would connect with such chain in the manner already described in connection with lightships.

I am aware that the transmission of signals whether telegraphic or telephonic over partially insulated or incomplete metallic circuits has been very frequently practiced, and I do not claim this broadly. My present claim, however, is based upon the discovery of a special way of successfully accomplishing a result universally regarded as of great importance, but as to which all previous attempts have been complete failures. The invention resides in the particular combination of devices hereinbefore described.

What I claim is—

1. A system of signaling between an anchored light-ship and the shore, comprising in combination telephonic or telegraphic signaling instruments and batteries on the ship and shore respectively, an insulated cable extending from the shore station to the ship's anchor with, which the core of the cable is electrically connected, a conducting anchor chain, and a circuit on the ship from said chain to a submerged metallic plate, said circuit including the signaling instruments on the ship, as set forth.

2. In a system of signaling between an anchored lightship and a shore station, the combination with telephonic signaling instruments at the shore station, and telephonic signaling instruments on the ship, of an insulated cable extending from the instruments on shore to a point near the anchor, a conducting anchor chain, a transformer interposed between the cable and the chain and having its low resistance coil in circuit with the anchor chain and its high resistance coil in circuit with the cable, and a circuit leading from the anchor chain to a submerged plate over the ship's side and including the instruments on the ship.

LUCIEN I. BLAKE.

Witnesses:
E. E. RUSH,
F. H. HODDER.