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 APPARATUS FOR SUBMARINE TELEGRAPHY AND SIGNALING.
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1,036,265.

Patented Aug. 20, 1912.

Fig. 1.

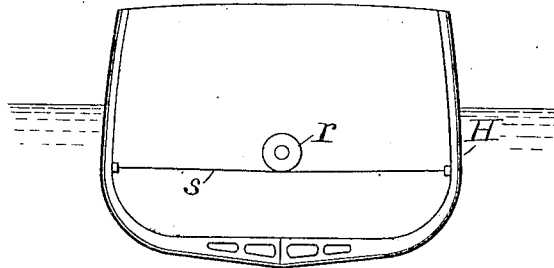


Fig. 2.

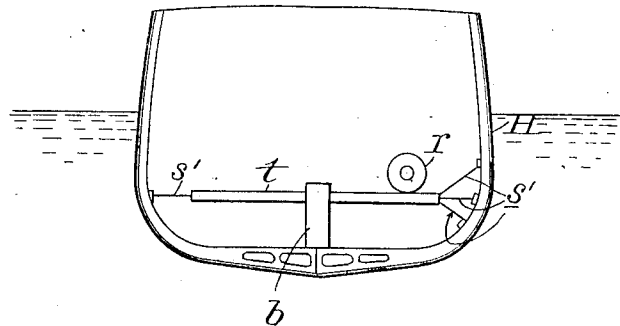
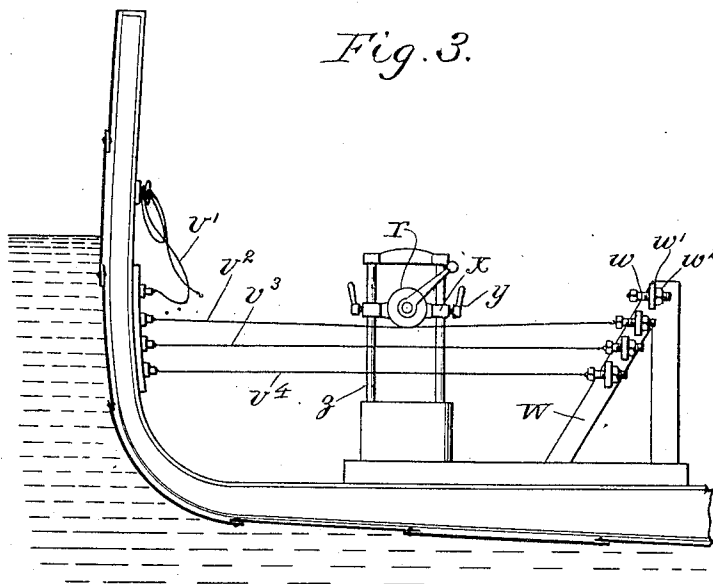


Fig. 3.



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR SUBMARINE TELEGRAPHY AND SIGNALING.

1,036,265.

Specification of Letters Patent.

Patented Aug. 20, 1912.

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To all whom it may concern:

Be it known that we, EUGEN KLUPATHY and CHRISTIAN BERGER, subjects of the King of Hungary, residing at Budapest, Austria-Hungary, have invented certain new and useful Improvements in Apparatus for Submarine Telegraphy and Signaling, of which the following is a specification.

Our invention relates to apparatus for submarine telegraphy and signaling, and more especially to such apparatus when the transmission is by means of sound waves, the impulses of which pass through water from the sending point to the receiving point.

As the invention will be specifically illustrated and described herein, it is shown applied to the production of audible sound waves in, and their transmission from, ships, although obviously the principles would be applicable to other and analogous situations. The present improvement implies a proper receiving apparatus, but as the details thereof do not *per se* form a part of this invention, the disclosure hereof is restricted to the sending apparatus.

The most important requirements for signaling and telegraphing by means of sound waves transmitted under water, are: that the transmitting device should be arranged in the interior of the ship or of some other body in the water; further that the sound producing device should be suitable for giving notes continuously, for instance for Morse signs; that the sound producing device should be suitable for producing high notes, more especially musical notes of high pitch, which are particularly well transmitted in water; and further that it should be possible to produce notes of different pitch. These requirements are only partly and not thoroughly complied with by the sound transmitting devices for submarine signaling at present known, and such known devices are also very complicated, whereas an apparatus constructed under the principles of the present invention may be extremely simple.

This invention relates to a transmitting device which fully complies with the above requirements.

In substance the present invention consists in a submarine telegraphing and signaling system wherein is employed a vi-

bratory member for producing (by its own vibrations) an audible note or tone, together with a sounding board (for example, the shell of a ship) which is located in the water for sending out the vibrations into the water, the apparatus being so arranged that the tone producing mechanism is located out of contact with the water, but directly connected with the sounding board. The side of a steel ship is peculiarly adaptable to this invention since it constitutes a plate or shell immersed at one surface in contact with open water, and out of contact with such water at its other surface, enabling it to be combined with a member adapted to sonorously vibrate, the latter being located at, and operatively connected with, the non-immersed side of the shell or plate for causing vibrations in the latter. While various forms of note producing mechanism could be employed, the present invention is illustrated with such mechanism consisting of a longitudinally vibratable member connected to the sounding board and suitably actuated.

Our experiments have shown that for attaining the purposes above stated strings stretched in the interior of the ship or other floating body between the walls of the same and vibrated in a suitable manner can be advantageously used, as vibration producing systems. When such a device is used, the ship or other body acts as a stringed instrument which, like musical instruments such as piano, violin, etc., forms an excellent submarine source of audible signals, etc.

We will first describe specific embodiments showing the general principles of the present invention in a more or less diagrammatic way, but amply full to enable those acquainted with the art to readily construct and apply the same.

In the accompanying drawings forming a part hereof, Figure 1 indicates a supposed cross-section of a floating ship or other vessel with all unnecessary parts omitted, and with the present invention shown embodied therein in a simple form. Fig. 2 in a similar view shows another form of embodiment of this invention. Fig. 3 in a part cross-section of a ship shows the invention when a plurality of note producing devices is employed.

Similar letters of reference designate cor-

responding parts in the several figures of the drawings.

A construction according to this invention is diagrammatically illustrated by way of example in Fig. 1 of the accompanying drawings. Between the lateral walls of the ship's body *H* shown in cross-section, is stretched a steel string *s*, the exciting of which can be effected transversely by striking, plucking, transverse rubbing, or by means of an electromagnet, or longitudinally by rubbing in the longitudinal direction. In the construction shown in Fig. 1 the string *s* is for instance excited in the longitudinal direction by the rotation of a friction wheel *r* covered by cloth or some other suitable material. The sound continues as long as the wheel is rotating or the string touched. In that way Morse signals can be produced. The number of strings can be of course increased as desired. The stretching of the same can be effected in the interior of the ship, or also from the outside above the water line between any desired points. By using several strings tuned to different pitches, notes of various pitches can be produced, which enables easily intelligible musical signals to be given. Besides ships, such a device can also be provided on any other floating bodies or on bodies immersed in water.

Experiments have shown that other excellent sound producers are rods fixed in the center, which can be easily excited owing to their both ends being free. An example of such a device is diagrammatically shown in Fig. 2, a fixing device *b* of any desired kind, secured to the ship's body *H*, holding in the center a bar or rod *t* which can be given longitudinal vibrations by means of a friction wheel *r*. A more perfect transmission to the ship's body could also be effected by means of cords, wires or the like *s'* connecting the free ends of the vibrating rods to the ship's body or to other floating bodies.

In Fig. 1 the string *s* and in Fig. 2 the rod or bar *t* is in effect a vibratory element extending between and connected at opposite ends to the walls of the hollow floating body or vessel, whereby when the element is set in vibration, such vibrations are transmitted to the walls of the hollow body or vessel and in turn transmitted to the body of water in which the vessel is located.

The exciting device can be operated either by hand or by means of suitable mechanism. It is obvious that exciting devices of any other desired kind, for instance reciprocating plucking devices can be used.

In Fig. 3 the system embodies a sending apparatus including the ship's shell as a sounding board located in the water for sending out vibrations into the water, together with means consisting of a plurality of vibratory members, *v'*, *v''*, *v'''*, *v''''*, each

connected directly with the sounding board but located out of contact with the water, the several vibratory elements being adapted or tuned for producing audible tones of different pitches, and having means for vibrating them. Thus the four vibratory elements are shown of graduated lengths, which would give them graduated pitches. Each of them may have at its inner end a threaded piece *w* passing through a fixed apertured piece *w'* on an inclined standard *W*, and a nut *w''* engaging the threads of piece *w* for tightening the member.

For vibrating the several members, a single friction wheel *r* may be employed mounted on a slidable crosshead *x* having means *y* for clamping it in the desired position on the guide rods *z*.

By detaching one of the vibratory elements as *v'*, the friction wheel *r* may thereupon be shifted into contact with the succeeding member *v''*, and it may be similarly shifted to any one of the elements.

What we claim and desire to secure by Letters Patent is:

1. In a submarine telegraphing and signaling system, the combination of mechanism including a vibratory member for producing by its own vibration an audible tone, and a sounding board located in the water for sending out vibrations into the water, the tone producing mechanism being located out of contact with the water and directly connected with the sounding board.

2. In a submarine telegraphing and signaling system, the combination of a sounding board located in the water for sending out vibrations into the water, a vibratory member for producing by its own vibrations an audible tone, said member being connected directly with the sounding board and disposed out of contact with the water, and mechanism for vibrating the vibratory member for producing audible tones.

3. In a submarine telegraphing and signaling system, the combination of a sounding board located in the water for sending out vibrations into the water, and a vibratory member for producing by its own vibrations an audible musical tone, said member being connected directly to the sounding board and disposed out of contact with the water.

4. In a submarine telegraphing and signaling system, the combination of a sounding board located in the water for sending out vibrations into the water, a vibratory member for producing by its own vibration an audible musical tone, said member being connected directly to the sounding board and located out of contact with the water, and mechanism for vibrating the vibratory member to produce audible musical tones.

5. In a submarine telegraphy and signaling system the combination with a hol-

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low floating body of a sound-producing vibratory element connected at opposite ends to the walls of the body, said body constituting a sounding board for sending out vibrations into the water.

6. In a submarine telegraphy and signaling system the combination with a ship's body of a sound-producing vibratory element connected at opposite ends to the walls of the body, the ship's body constituting a sounding board for sending out vibrations into the water.

7. In a submarine telegraphy and signaling system the combination with a hollow floating body of elongated sound-producing vibrating members stretched between the walls of said body and means for causing said members to vibrate.

8. In a submarine telegraphing and signaling system, the combination of a hollow floating body, a tone-producing vibrating member connected to a wall of the body, a support on which the member is mounted, and means for causing said member to vibrate, the said wall of the body constituting a sounding board for sending out vibrations into the water.

9. In a submarine telegraphy and signaling system the combination with a hollow floating body of a rod, means for supporting the rod between its ends, and means for causing said rod to vibrate, said body constituting a sounding board for sending out vibrations into the water.

10. In a submarine telegraphy and signaling system the combination with a hollow floating body of a rod, means for supporting the rod between its ends, means for causing said rod to vibrate, and wire-like means for connecting the ends of said rod to the walls of said body, which latter constitutes a sounding board for sending out vibrations into the water.

11. In a submarine telegraphy and signaling system the combination with a hollow floating body, of a rod, means for supporting the rod between its ends, wire-like means for connecting the ends of said rod to the walls of said body, and a friction wheel for causing said rod to vibrate, said body constituting a sounding board for sending out vibrations into the water.

12. In a submarine telegraphy and signaling system the combination with a hollow floating body, of a rod, means for supporting the rod between its ends, wire-like means for connecting the ends of said rod to the walls of said body, and a friction wheel faced with cloth for causing said rod to vibrate, said body constituting a sounding

board for sending out vibrations into the water.

13. A submarine signaling apparatus including a hollow floating body constituting a sounding board for sending out vibrations into the water, a sound-producing vibrating element connected at opposite ends to the body and supported free to vibrate, and means for imparting vibrations to the vibrating element.

14. In a submarine telegraphing and signaling system, the combination of a sounding board located in the water for sending out vibrations into the water, and a note-producing mechanism for producing by the vibrations of its own material audible tones of different pitches, such mechanism being connected directly to the sounding board and located out of contact with the water.

15. A submarine signaling apparatus including a sounding board located in the water for sending out vibrations into the water, and means connected directly with the sounding board and out of contact with the water for producing audible tones of different pitches, said means including vibratory elements tuned to different pitches, and means for vibrating the vibratory elements.

16. In a submarine signaling or telegraphing apparatus, a plate or shell immersed at one surface to contact open water and out of contact with such water on its other surface, in combination with a member adapted to sonorously vibrate, said member being located out of contact with such water, and operatively connected with the non-immersed side of such shell or plate for causing vibrations in the latter.

17. In a submarine signaling or telegraphing apparatus, a plate or shell immersed at one surface to contact open water and out of contact with such water on its other surface, in combination with a member adapted to sonorously vibrate, and mechanism for producing vibrations in said member, said member and mechanism being located out of contact with such water, and operatively connected with the non-immersed side of such shell or plate for causing vibrations in the latter.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

EUGEN KLUPATHY.
CHRISTIAN BERGER.

Witnesses:

ARTHUR B. SINGER,
IRENE ROTHMEY.