

R. A. FESSENDEN.
 SIGNALING.
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916,428.

Patented Mar. 30, 1909.

FIG. 1.

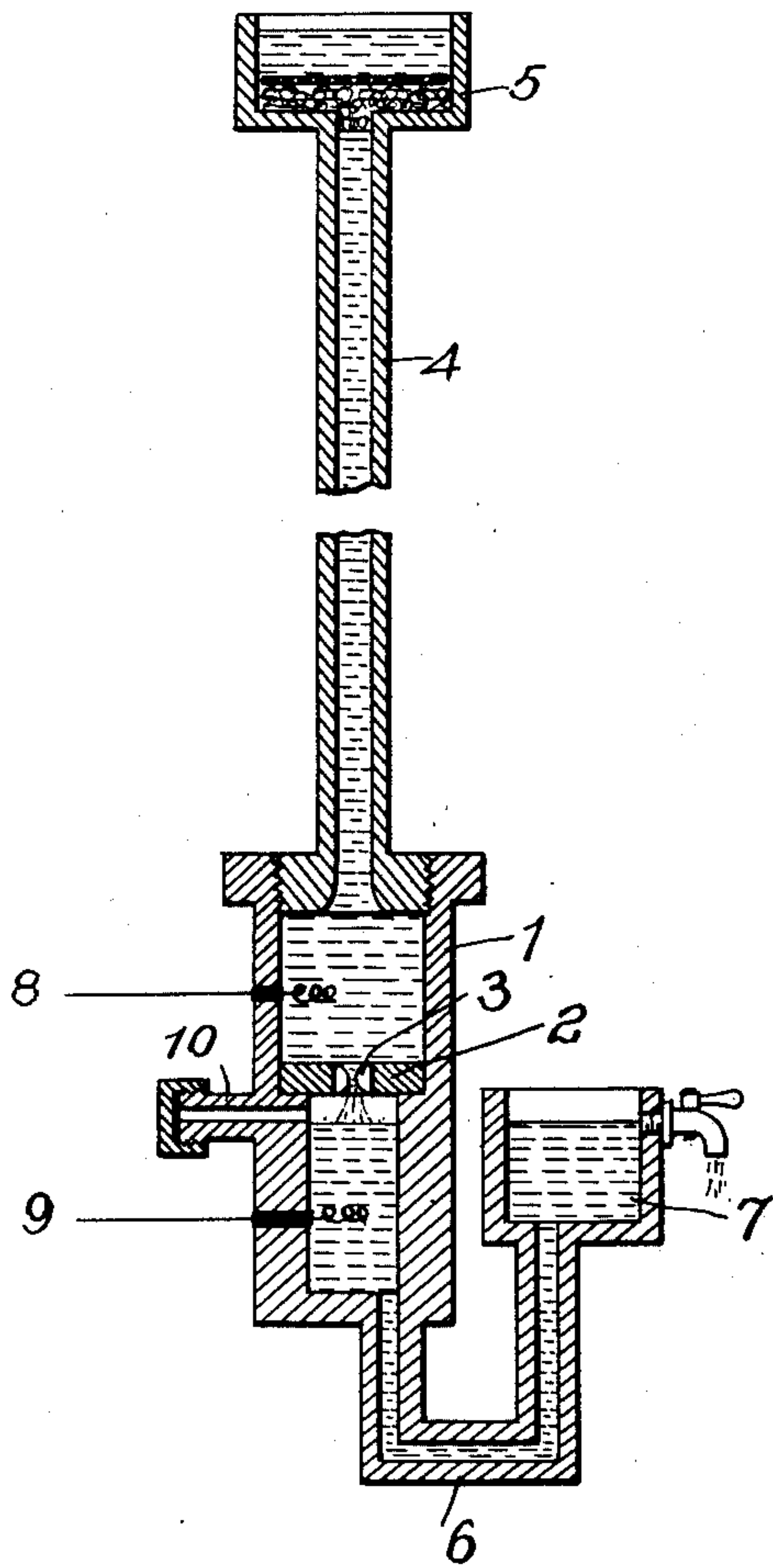
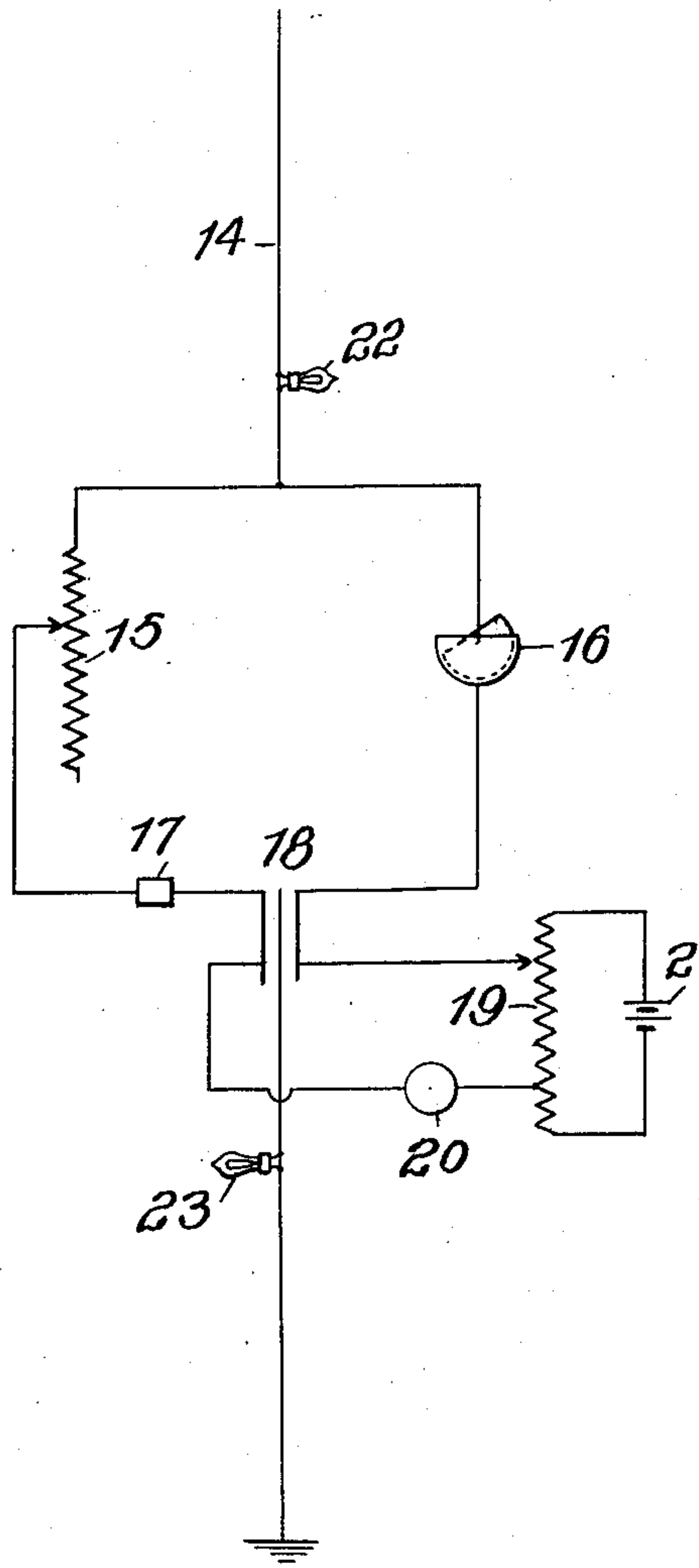


FIG. 2.



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UNITED STATES PATENT OFFICE.

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SIGNALING.

No. 916,428.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, REGINALD A. FESSENDEN, citizen of the United States, and resident of Washington, District of Columbia, have invented certain new and useful Improvements in Signaling, of which the following is a specification.

The invention described herein relates to certain improvements in receivers for electromagnetic waves of the class or kind described and claimed in Reissue Letters Patent 12,115 and especially to the receivers of the type shown in Figure 3 of said patent. The form of receiver illustrated in Fig. 3 is very reliable and sensitive in operation but is liable at times of being rendered inoperative by the choking up of the minute hole in the diaphragm by minute particles of dirt. It has also been found that very heavy discharges have a tendency to enlarge the hole.

The object of the present invention is to provide suitable means whereby the receiver is rendered more sensitive and reliable and also to prevent by the use of suitable material the enlargement of the perforation through heavy discharges.

The invention is hereinafter more fully described and claimed.

In the accompanying drawings forming a part of this specification Fig. 1 is a sectional elevation of the receiver embodying my improvements and Fig. 2 shows a method of connecting the receiver in a circuit which is especially applicable in making exact measurements on wave lengths.

In the practice of my invention the chamber or receptacle 1 which may be made of hard rubber or other suitable material is provided at a suitable point in its length with a diaphragm 2 formed of hard rubber. Through this diaphragm is formed a perforation having its wall formed of highly refractory non-conducting material. This is conveniently done by securing a diamond die such as is used for drawing wire in the diaphragm or a perforated sheet of mica may be used in connection with some liquids. The portion of the receptacle above the diaphragm is connected by thin tube 4 with a reservoir 5 for liquid which is preferably an acid or a solution of metallic salts preferably alkali such for example as nitric-acid, hydrochloric-acid or caustic potash. The reservoir should be arranged at such a height above the receptacle as to maintain a considerable pressure of liquid so as to insure a

flow thereof through the opening of the diaphragm. The portion of the receptacle 1 below the diaphragm is connected by a tube 6 with a vessel 7 having an overflow spout provided with suitable means for regulating the outflow of the liquid whereby to regulate the level of the liquid below the diaphragm. Terminals 8 and 9 preferably large and preferably formed of platinum-iridium or suitable material extends into the receptacle 1 above and below the diaphragm as shown. Below the diaphragm the vessel is provided with an outlet tube 10 whereby air which may be carried through the opening in the diaphragm can be allowed to escape. This tube is normally kept in a closed condition.

In order to prevent as far as possible any dirt or foreign matter being carried down into the receptacle a filtering chamber is provided in the reservoir 5 as shown. This receiver is preferably connected in use in a local circuit preferably containing an indicating mechanism such as a telephone, also a potentiometer.

In consequence of the constant flow due to the pressure through the opening 3 any slight particles of dirt or small bubbles of gas will be carried through the opening 3 and hence it preserves the receiver in a normal, operating condition. It is also found that the polarity of the terminals 8 and 9 is of importance in this connection as the small particles appear to be carried by the electric action of the current. The direction of this carriage varies with different liquids and probably with the character of the particles. The polarity of the terminals is therefore empirically so arranged that with a given liquid used the electrical carriage will tend to be in the direction opposite to the flow of the liquid. The level of the liquid in the lower part of the receptacle 1 may be raised up until it touches the opening of the diaphragm or may be maintained at a slightly lower level as shown. The results vary with different liquids and with highly conducting liquids the level is preferably kept low though this is not essential. This form of receiver is especially applicable for use in connection with the measurement of wave lengths and in Fig. 2 is shown a suitable form of connections for such purpose. The antenna 14 is grounded and an inductance 15, condenser 16 both preferably variable and the described receiver 17 are connected as

shown in circuit with the antenna. A large condenser 18 preferably has the metallic armature of the plates connected to the ground terminal and the two outer plates connected 5 to the receiver and variable capacity respectively. An indicating mechanism 20 such as the Paul microammeter, a potentiometer 19 and a battery 21 are operatively connected as shown to the aerial. When using 10 this apparatus for the measurement of wave lengths the inductance 15 or capacity 18 are varied until a maximum reading is obtained on the indicating mechanism 20 and this maximum is obtained when the circuit 15 15, 16 is in resonance with the received oscillations. By then reading the values of the inductance and capacity the wave length may be determined. High resistances 22 and 23 preferably in the form of incandescent lamps are preferably placed in series 20 with the antennæ and the ground connection for the purpose of damping the frequency oscillations of the antennæ.

I claim herein as my invention:

25 1. A receiver for electromagnetic waves having in combination a vessel or receptacle having a diaphragm provided with a perforation, means for causing a flow of liquid through the perforation and terminals connecting with the liquid on opposite sides of 30 the diaphragm.

2. A receiver for electromagnetic waves

having in combination a receptacle having a diaphragm provided with a perforation having its wall formed of a highly refrac- 35 tory material, means for causing a flow of liquid through the perforation and terminals connected to the stream of liquid on opposite sides of the diaphragm.

3. A receiver for electromagnetic waves 40 having in combination a receptacle having a diaphragm provided with a diamond wall perforation, means for causing a flow of liquid through the perforation and terminals connected to the stream of liquid on oppo- 45 site sides of the diaphragm.

4. A receiver for electromagnetic waves having in combination a receptacle or vessel provided with a perforated diaphragm, a reservoir for liquid connected to the recep- 50 tacle on one side of the diaphragm, a discharge passage connected to the receptacle on the opposite side of the diaphragm, means for regulating the level of the liquid on one side of the diaphragm and terminals adapted 55 to be connected to the liquid on opposite sides of the diaphragm.

Signed at Brant Rock in the county of Plymouth and State of Massachusetts this eighth day of November A. D. 1905.

REGINALD A. FESSENDEN.

Witnesses:

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JESSIE E. BENT.