No. 736,483. PATENTED AUG. 18, 1903.

G. F. R. BLOCHMANN.

TELEGRAPHIC TRANSMITTING AND RECEIVING APPARATUS.

APPLICATION FILED JUNE 7, 1901.

NO MODEL.

Fig. 1.

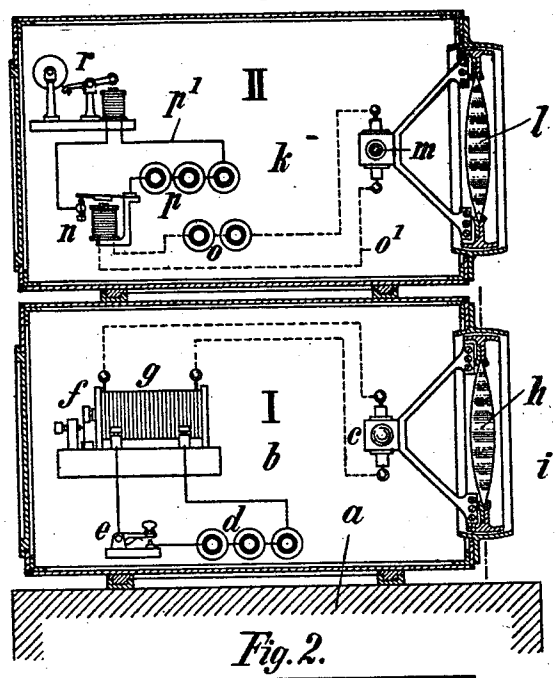


Fig. 3.

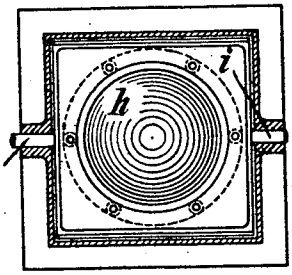
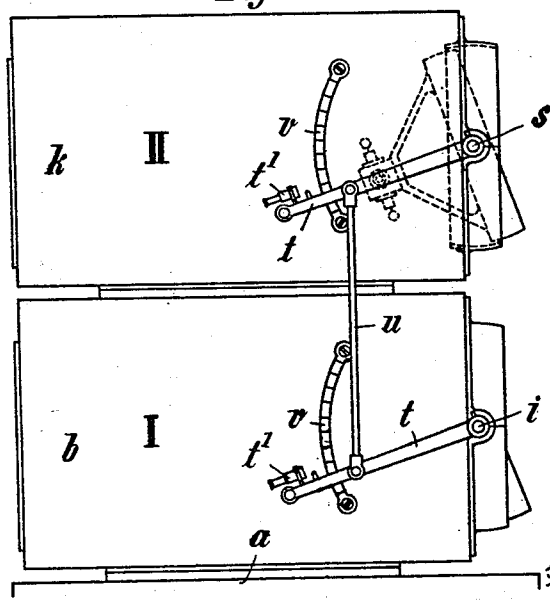


Fig. 2.



Witnesses.

Inventor.

Georg Friedrich Rudolf Blochmann

by

Atty.

THE NORRIS PETERS CO., PHOTO-LITHO. WASHINGTON, D. C.

Search Room

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UNITED STATES PATENT OFFICE.

GEORG FRIEDRICH RUDOLF BLOCHMANN, OF KIEL, GERMANY, ASSIGNOR OF ONE-HALF TO CHRISTIAN EMIL BICHEL, OF HAMBURG, GERMANY.

TELEGRAPHIC TRANSMITTING AND RECEIVING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 736,483, dated August 18, 1903.

Application filed June 7, 1901. Serial No. 63,593. (No model.)

To all whom it may concern:

Be it known that I, GEORG FRIEDRICH RUDOLF BLOCHMANN, a subject of the German Emperor, and a resident of Kiel, in the German Empire, have invented certain new and useful Improvements in Telegraphic Transmitting and Receiving Apparatus, of which the following is a specification.

This invention relates to an improved apparatus for transmitting and receiving signals in any desired direction by means of electric rays or waves; and it consists of several chambers which either entirely or almost entirely prevent or intercept the passage of electric rays and each of which is fitted with one or more indicators (detectors) or a generator for electric rays and provided with one or more apertures furnished with one or more adjustable lens-shaped bodies of a material capable of readily emitting or admitting electric rays in such a manner as to cause said rays admitted into or emitted from each of the chambers to be transmitted in a definite direction by the said lens or lenses.

My invention consists of certain novel features of construction and combinations of parts, as hereinafter described with reference to the accompanying drawings, in which—

Figure 1 is a vertical sectional elevation of my improved apparatus capable both of sending and receiving electric rays or waves in any definite directions. Fig. 2 is an elevation of the same; and Fig. 3 is a front view, partly in section, of an inlet or outlet lens and its bearing.

Similar letters refer to similar parts throughout the several figures.

According to this invention I provide a transmitter I, consisting of a casing *b*, covered with a material which will entirely or almost entirely prevent or intercept the passage of electric rays except at one or several places occupied by a lens *h* or a plurality of such lenses or lens-shaped bodies, of a suitable electric-wave refracting material, as rosin, wax, and the like. This casing may be pivotally mounted on a suitable support *a* in such a manner as to be capable of being turned in any desired direction to adjust or position them in azimuth. In the interior of the said casing is provided a generator or producer of electric rays and its operating mechanism, or this latter may, if desired, be arranged outside the casing in any convenient position. According to the method of construction shown in the drawings the casing *b* contains an electric source—such as a battery *d*, for instance—a key instrument *e* for producing telegraphic signs, an interrupter *f*, an induction-coil *g*, and an oscillator or radiator *c*. If desired, the electrical energy may be obtained by other means, such as by an alternating-current dynamo. The lens *h*, which by means of journals *i* oscillates on a horizontal axis, and the radiator *c* are connected together in such a manner that the latter is or may be placed in the focus of the lens in every position of this latter. For exact adjustment the axis of the lens may be arranged to slide. By the twofold motion of the lens with the casing on the one hand and relatively to the casing on the other hand the radiator *c* is enabled to transmit electric rays in any desired direction, both in azimuth and altitude. The same effect may be obtained by other means—for example, by suspension of the casing from gimbals or as in light-projectors or in the manner of mounting of turret-guns.

Above the transmitter I, hereinbefore described, is arranged the receiver I I, consisting of a casing *k*, similar to the one above described and containing the receiving mechanism. The casing *k* may, if desired, be arranged beneath or at the side of the casing *b* and may be or not immediately connected therewith. In the focus of the lens *l* of the receiver-casing *k* is placed a ray-detector *m*, and the mechanism for indicating the working of the detector may be placed within or without the said casing *k*. If the detector is a coherer or similar apparatus with microphonic contact and if it is desired to register the spark-telegrams, the arrangement must comprise a relay *n*, in circuit with the said detector *m*, and a local battery *o* and a second circuit *p'*, actuated by the said relay *n* and provided with a local battery *p* and a telegraphic registering apparatus *r*. For a telephonic recording of the signals the relay *n* is

replaced by one or more telephones. If, however, in lieu of the reception of a telegram or the call or a reply other work is to be performed—for example, the firing of a mine by electricity—it will be necessary to intercalate an appropriate apparatus. The arrangement may, for instance, be such that the key instrument *e* of the transmitter I is closed for a certain time or that by the medium of a segmental wheel or the like, arranged and intercalated in a suitable manner, the transmission of certain signs or series of signs may be effected or performed during a predetermined period.

It is to be understood that all auxiliary means for optical purposes, for intensifying, enlarging, &c., may also be used in connection with wave or ray telegraphy. For example, several or compound lenses may be fitted in the apertures of the chambers. It is further to be understood that the chambers are or may be provided with doors and windows to allow of access to or inspection of the mechanisms in the interior of the said chambers and that their movement or that of the lenses thereof may be independent or coupled together.

Where the lenses *h* and *l* are to be coupled together, the pivots *i* or *s*, respectively, of the same may be rigidly connected together by means of appropriate levers *t* and a connecting-rod *u* or rods. The said levers may be fitted with an object-glass *t'*, so as to find the proper direction for their adjustment, and such adjustment may be facilitated by placing the levers in front of curved and graduated bars *v*. The object-glass may, however, be fitted in any other manner to the lenses or their mountings.

The electric-ray telegraphy is capable by means of the adjustable apparatus presented to serve for a greater variety of purposes and in a more exact manner than those used in connection with spark telegraphy.

Having now particularly described and ascertained the nature of my invention and in what manner the same is to be performed, I declare that what I claim is—

1. In a wireless telegraphic apparatus, a receiving instrument and a transmitting instrument, a casing inclosing each of said instruments adapted to screen them from electric waves, except at one point and means to permit rotation of said casings and their inclosed instruments, substantially as and for the purpose set forth.

2. In a wireless telegraphic apparatus, a receiving instrument and a transmitting instrument, superposed casings inclosing said instruments and adapted to screen the instruments from the action of electric waves except at one side, and means to independently permit the rotation of the casings and their contained instruments, substantially as and for the purpose set forth.

3. In a wireless telegraphic apparatus, a receiving instrument and a transmitting instrument, superposed metallic casings inclosing them to screen said instruments from electric waves except at one side, means to simultaneously and independently permit rotation of the casings about a vertical axis and thereby receive and send messages in a determined direction only, substantially as and for the purpose set forth.

4. In a wireless telegraphic apparatus, a receiving instrument and a transmitting instrument, a casing inclosing each of said instruments except at one side, means to permit simultaneously and independently the adjustment of the instruments and their casings in azimuth, and independent mechanism to adjust the instruments in altitude, substantially as and for the purpose set forth.

5. In a wireless telegraphic apparatus, a receiving instrument and a transmitting instrument, a casing inclosing each of them and superposed, means to permit the simultaneous adjustment of the instruments and their casings in azimuth, and means to simultaneously adjust the instruments in altitude, substantially as and for the purpose set forth.

6. In a wireless telegraphic apparatus, a metallic casing, a transmitter therein, a lens adjustably mounted in the casing, a transmitting device fixed in the focus of the lens and movable therewith, a second casing superposed on the first-mentioned one, a lens adjustably mounted in the casing and a receiving device fixed in the focus of the lens and movable therewith, means to permit the independent and simultaneous adjustment of the casings and means to independently and simultaneously adjust the lenses, substantially as and for the purpose set forth.

7. In a wireless telegraphic apparatus, a metallic casing, a lens or lenses mounted therein, a radiator secured in the focus of the lens or lenses, and generating mechanism also in said casing, whereby waves will be sent only through said lens and a second casing, a lens or lenses mounted therein, a ray-detector secured in the focus of the lens or lenses and receiving mechanism in the casing whereby said detector and mechanism will be screened from all waves except those coming through the lens or lenses, means to permit the simultaneous and independent adjustment of the casings in azimuth and means to simultaneously and independently adjust the lenses in altitude, substantially as and for the purpose set forth.

GEORG FRIEDRICH RUDOLF BLOCHMANN.

Witnesses:
MAX LEMCKE,
ERNEST H. L. MUMMENHOFF.