I. KITSEE.

TELEGRAPHIC RELAY.

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963,298.

Patented July 5, 1910.

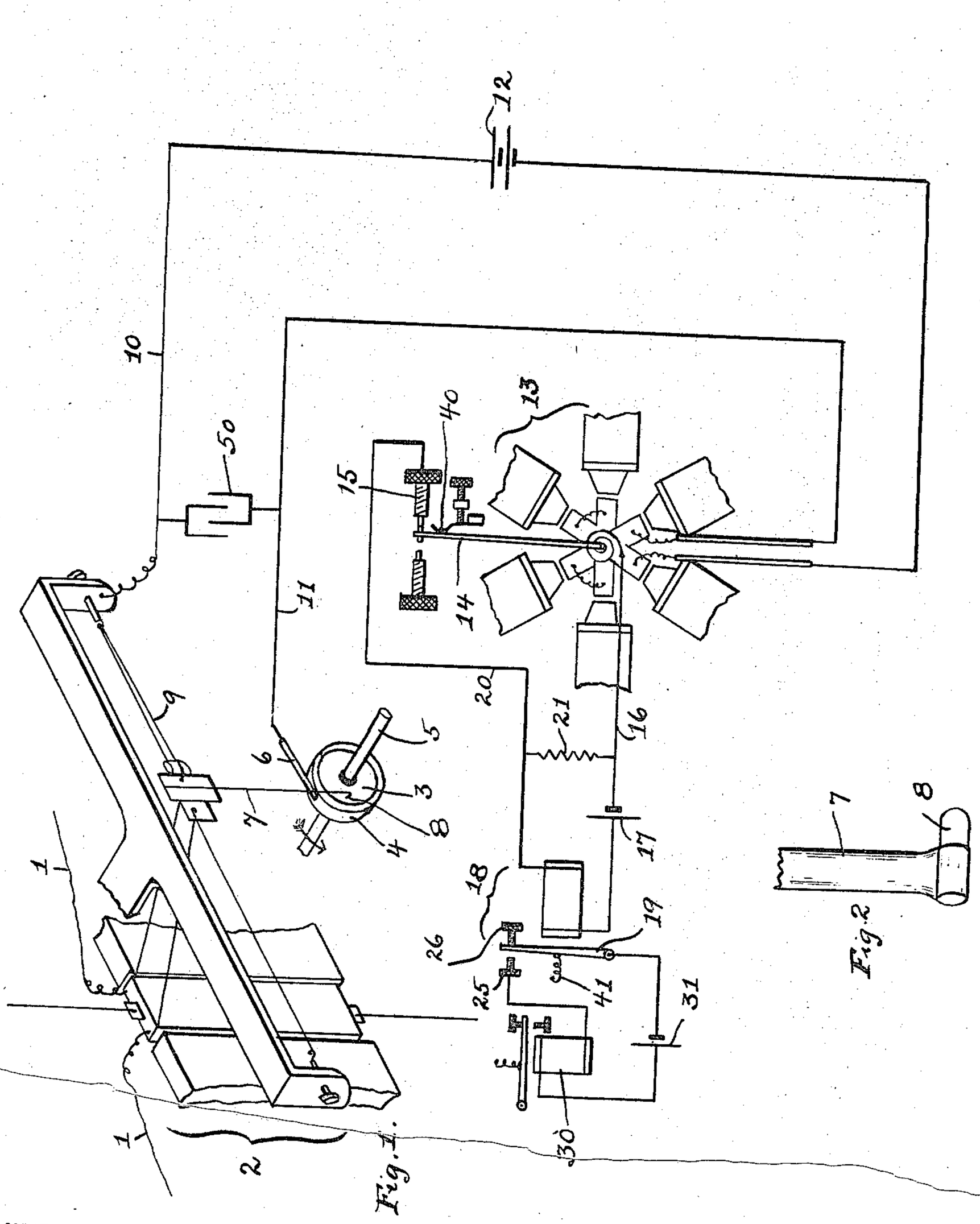

Fig. 1.

Fig. 2.

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TELEGRAPHIC RELAY.

963,298. Specification of Letters Patent. Patented July 5, 1910.

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To all whom it may concern:

Be it known that I, ISIDOR KITSEE, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Telegraphic Relays, of which the following is a specification.

My invention relates to an improvement in telegraphic relays and has more special reference to relays adapted to respond to feeble impulses, such for instance as are received on submarine cables.

In my experiments extending over a number of years, I have found that no matter how sensitive the relay proper, it is well nigh impossible to make reliable contacts with the metallic relaying parts. After experimenting with different materials, I found that the best results are obtained when the relaying parts, *i. e.* the parts to be connected and disconnected so as to operate a local circuit, are composed of "graphite." I had good results with an instrument, the stationary part of which consisted of a graphite disk inclosed in a metallic frame and the movable arm of which consisted of a metal, but the best results I obtained when both contacting parts consisted of graphite. When the stationary part consisted of metal, no matter how finely polished the surface was, the arm or lever contacting therewith could not be relied upon for such contact, but when the stationary contact consisted of graphite, no matter how rough the surface was, the contact was always reliable. In an instrument which was placed in a line comprising 8000 ohms resistance and 260 micro-farad capacity, the surface of the graphite disk was roughed to an extent that the hills and valleys—so to speak—of same could be easily distinguished with the naked eye, and yet with this instrument I received over this line more than 400 impulses per minute, designating characters of the telegraphic alphabet, and translated the same correctly into sound. I found that when the two contacting parts consist of graphite, the so-called "stationary part" may be entirely stationary or may, with the aid of suitable means, be revolved. In some of my experiments, the relay comprised the movable coil stationed in a magnetic field, such as is used in Sir Kelvin's instrument, the graphite disk inclosed in a metallic ring was revolved with the aid of an electric motor and the contact part, adapted to be operated through the movement of the coil, consisted of a thin aluminium wire with graphite terminal. I have also found that it is advantageous to overbridge these points with a capacity. This capacity must have a certain relation to the local circuit and I found that 2 micro-farads answered the purpose best. When the capacity is increased to about 5 or 10 micro-farads, then sparking commences at the two contacting points and the instrument becomes unreliable, and when the capacity is reduced to about one-half of a micro-farad, then its beneficial effect is not felt. It has to be stated again that most of these experiments were made over a line of the above stated electrical properties; in fact, a line running from New York to Canso. I also found that the relay proper could not, with practical reliability, work a sounder direct and I found that the arrangement substantially as illustrated in the accompanying drawing was best suited for translating impulses received over the cable into readable characters.

In the drawing, Figure 1 is a diagrammatic view of a receiving organism embodying my invention; and Fig. 2 is an enlarged plan of the lever or arm and the graphite point attached thereto.

1, 1, is the line; 2 the relay as an entirety; 3 the graphite disk which may be stationary or revolving; 4 the metallic housing; 5 the axis supporting the graphite disk with its housing. This axis moves here in the direction of the arrow.

6 is a brush contacting with the metallic housing and therefore with the graphite disk; 7 is a metallic arm or lever provided with the graphite terminal or point 8; 9 is the suspension of the arm. This suspension is conducting. 10 is the wire connecting with said suspension; 11 the wire connecting with the brush 6. These two wires connect,

with the interposition of the battery 12, the local or intermediate relay 13. This relay is here shown as of the multiple coil type, but it is obvious that any other suitable relay may be substituted therefor.

50 is the condenser overbridging or shunting the relaying parts.

The relay 13 is provided with the arm 14 and the contact 15. Even this intermediate relay does not work directly the sounder and I have found it expèdient to insert between the sounder and this intermediate relay, a second relay of the usual type, and I designate this second local relay as an entirety by the numeral 18. The arm 14 of relay 13 is connected through wire 16 with the interposition of battery 17 to one terminal of the coil of relay 18 and the contact point 15 is connected through wire 20 to the second terminal of said coil.

21 is a resistance, here shown as shunting the coil of 18.

The relay 18 is provided with the armature 19 and stops 25 and 26.

30 is a sounder or other translating device and its coil is connected with one terminal to stop 25 and with the other terminal, with the interposition of battery 31, to armature 19.

In the work of relays over submarine cables, I have found that it is far more advantageous when the relaying contacts are normally connected with each other and are broken through the incoming impulse and, therefore, the contact 8 connects normally with the disk 3. A circuit, therefore, embracing the battery 12 and the relay 13 is normally made and the tongue 14 rests normally against the stop 15. It has to be stated that this tongue is provided with means, here shown as spring 40, to move the same away from this contact 15 as soon as the circuit is broken. Through the normal contacting of the tongue 14 with the contact 15, the circuit including the relay 18 and the battery 17 is also made and the armature 19 is thereby compelled to rest against the stop 26. It has also to be stated that this armature is provided with means, here shown as the spring 41, to break this contact as soon as the circuit is broken. Normally, therefore, all relaying contacts are in the position as shown and the sounder or translator circuit is, therefore, open. When now through the force of an incoming impulse, the lever or arm 7 is forced away from the disk 3, then the circuit including the battery 12 and relay 13 is broken. The tongue 14 breaks its contact with 15 whereby the circuit including battery 17 and relay 18 is broken releasing the armature 19 and the same will, impelled by its spring 41, make contact with the stop 25 closing the circuit including the translator 30 and if this translator is a sounder, the armature thereof will be thrown downward.

As it is not my intention to claim in this application the entire system of telegraphy, I do not need to go into detail of the transmitting part. It suffices to say that if the condensers are taken out of the cable, the greater or shorter part of the closing of the key may produce an impulse of shorter or longer duration, or other means may be provided so that the operator may be notified through the operation of the translator 30 if the received impulse is a dot or dash.

In Fig. 2; 7 is part of the arm or lever and 8 the graphite point. In practice, I have found that if the whole arm consists of graphite, the weight of this material greatly impairs the reliable working of the relay and I, therefore, had recourse to the following arrangement:—I secured the graphite point by simply coiling the end of the arm around said point and compressing the coil for the purpose of making a good contact. In conclusion I will state that I have tried to substitute for the graphite a carbon, but found the same far less advantageous than graphite; in fact, the sticking, which is so noticeable in metallic contacts, was also to a great extent noticeable in carbon contacts, and when the contacting was rapid, the sticking on the carbon points was even more noticeable than on common metallic points.

Having now described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. A relay provided with contacts consisting of graphite.

2. In combination with a telegraphic relay, relaying contacts therefor, one of said contacts operatively related to the movable part of said relay and terminating in a graphite point, the second of said contacts presenting to the first contact a disk-like surface consisting of graphite.

3. In a cable relay, two contacting parts, each of said parts comprising a graphite contact.

4. A telegraphic relay comprising stationary and movable parts, relaying contacts for said parts, at least one of said relaying contacts comprising graphite.

5. A relay having a contact formed of graphite.

6. In a telegraphic relay useful for lines with great capacity, two contacts therefor, one contact operatively related to the movable part of said relay, the second contact in proximity to the first contact, the second contact consisting of graphite.

7. A telegraphic relay, contacting parts therefor, one of said contacting parts com-

prising a metallic tongue and a graphite point carried by said tongue; the second of said contacting parts comprising a metal and a graphite supported by said metal.

8. In combination with a line relay, a contacting tongue or lever, said contacting tongue or lever comprising a metal and a graphite, the graphite supported by said metal.

9. In a line relay, a contact therefor, said contact comprising a graphite disk and a metallic housing therefor.

10. In a telegraphic relay, two contacts therefor, one contact comprising a graphite and a metallic housing, and means to revolve said graphite and housing, the second contact comprising a metal and a graphite, the metal supporting said graphite.

In testimony whereof I affix my signature in presence of two witnesses.

ISIDOR KITSEE.

Witnesses:
EDITH R. WILLEY,
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