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J. J. GHEGAN.

DUPLEX TELEGRAPH.

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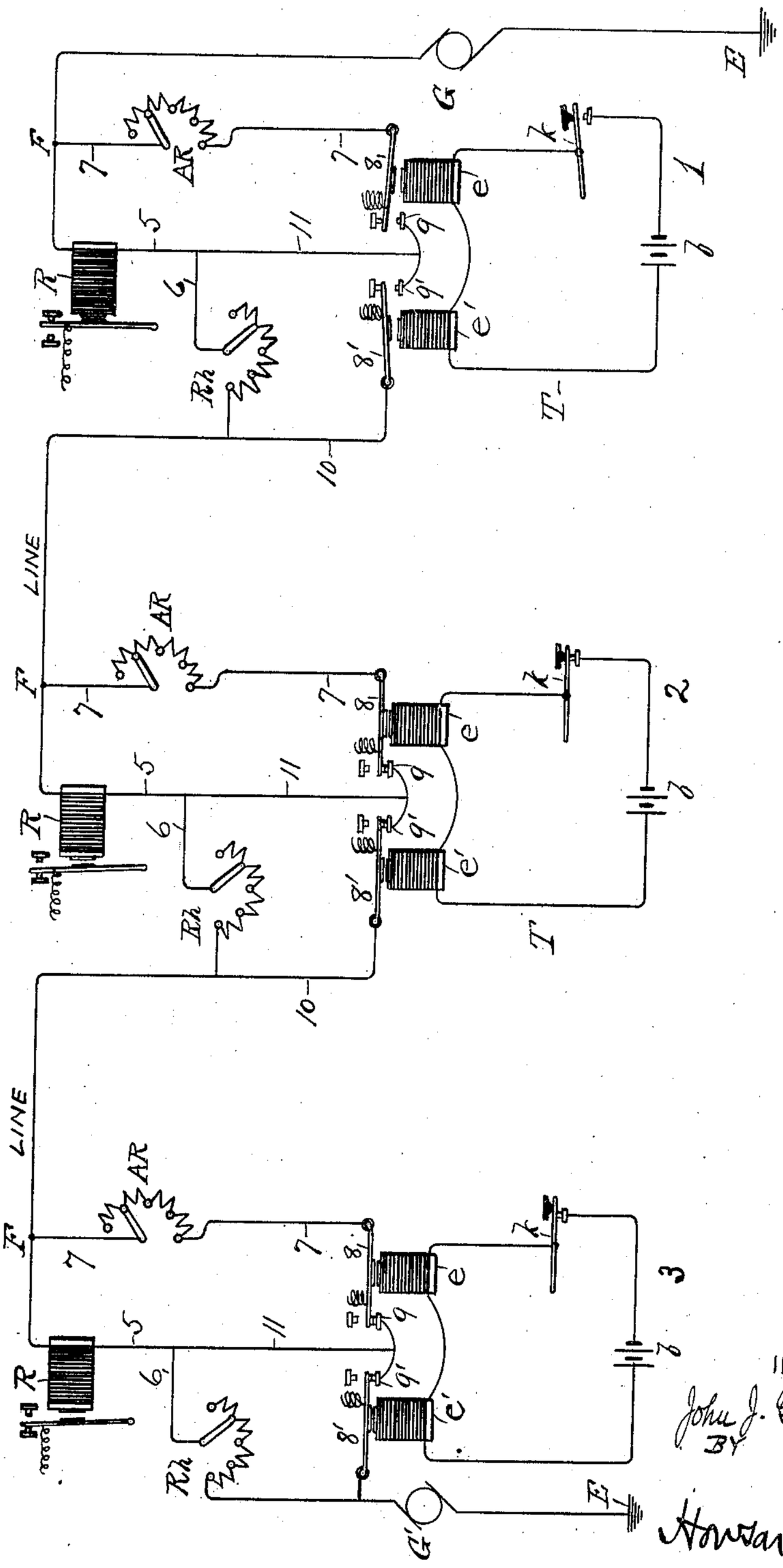

WITNESSES

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DUPLEX TELEGRAPH.

No. 887,038. Specification of Letters Patent. Patented May 5, 1908.

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To all whom it may concern:

Be it known that I, JOHN J. GHEGAN, a citizen of the United States of America, residing in the city of Newark, county of Essex, State of New Jersey, have invented certain new and useful Improvements in Duplex Telegraphs, of which the following is a specification.

The object of my invention is to provide a simplified system of duplex telegraph, which while applicable in connection with various forms of relays, including differential or double wound relays, is especially useful in its applicability to the ordinary single wound instruments and line current arrangements without requiring any change in them.

By the use of my invention it is possible to have one or more intermediate stations in the circuit, and to duplex an ordinary way circuit for all or only some of the offices on the line.

A characteristic feature of my invention consists in providing in connection with the relay and ordinary equipment in each office a transmitter and two artificial resistances, one of which is in a shunt around the relay and is thrown into circuit on the closure of the local transmitter circuit at the same instant that the other resistance (which is in circuit in the main line when transmitter is open) is shunted or short-circuited; so that by thus decreasing or increasing the resistance of the line circuit, all relays except that at the transmitting station will respond.

The diagram in the accompanying drawing illustrates a convenient form or arrangement by which my invention may be carried into effect. In this diagram I have shown three stations, marked 1, 2 and 3, the arrangements for the several stations, whether terminal or intermediate, being alike.

At terminal station 1, I have indicated a ground connection at E and a generator at G, and at the other terminal station I have indicated a ground connection at E^1 and a generator at G^1. The line connection from the generator G passes through the coils of the ordinary single wound Morse relay R and thence through conductors 5, 6 and through artificial resistance R*h* to the line leading to the next station. At F is a branch or shunt 7 containing an artificial resistance AR and connected to the armature 8 of a pair of electromagnets *e*, e^1 in the local transmitter circuit T, containing a local battery *b* and transmitter key *k*. The other armature 8^1 of the transmitter electromagnets is connected through wire 10 to the line leading to the next station (or in the case of station 3 to the generator G^1). The front stops 9, 9^1 of this double contact transmitter are electrically connected with each other so that when the local transmitter circuit is closed, the shunt circuit around the relay R is closed through 7, resistance AR, armatures 8, 8^1, and wire 10. The wire 5 is also connected through wire 11 to the front stop 9^1. I prefer to make both resistances AR and R*h* adjustable, although the result may be accomplished by the adjustment of the resistance AR only. To simplify the diagram, the local circuits of the relays R have not been shown.

In the diagram I have indicated the transmitter circuits are closed at stations 2 and 3 while open at station 1.

When the transmitter circuit is open, as shown at 1, the current has only one path to follow; that is through the relay R and resistance R*h*, but when the transmitter circuit is closed, the current can then flow through the shunt 7, 8, 9, 8^1, 10 containing resistance AR, as well as through the relay R, wire 11, armature 8^1 and wire 10, in shunt around resistance R*h*. The transmitter circuits are normally closed, and the relays R are so adjusted that when these shunt circuits at the different stations are closed accordingly, and all the resistances R*h* are thus cut out, the armatures of the relays R will be drawn up to their front stops. But when a transmitter key *k* is opened at the transmitting station, and the two shunt circuits 7—10 and 11—10 around the relay and its resistance R*h* are thereby broken or opened, as shown at station 1, the line resistance is increased by the consequent introduction of the resistance R*h*, at the transmitting station, so as to cause the armatures of the relays R at the other stations to be released, to their back stops, as indicated at stations 2 and 3.

The armature of the relay R at the transmitting station is not released, however, because the resistance in the shunt 7—10 is so proportioned to that of the relay R as to give approximately the same magnetic pull to the relay when it is getting a portion of the stronger current (on closure of the shunts) as it has when the entire weaker current is passing through the relay coils (when the shunts 7—10 and 11—10 are open). Therefore if station 3 wishes to transmit to station 1,

while the latter is transmitting to station 3, the relay R at station 1 will be ready to receive.

It will be understood that my duplex system can be operated by current taken at one or several points on the line the same as an ordinary single Morse circuit, that part or all of the offices on the line may be duplexed, that the duplexed offices can work with non-duplexed ones by having an ordinary key in the line circuit, and that by substituting another transmitter for the ordinary sounder, lines duplexed in this manner can automatically repeat to each other.

I claim as my invention:

1. A duplex telegraph system, having a relay and adjustable resistance in the line in combination with two shunt circuits, one around the relay and the other around said line resistance, and a transmitter controlling said shunt circuits, whereby the operation of the transmitter increases or decreases the resistance in the line to operate a distant relay without affecting the relay at the transmitting station.

2. A duplex telegraph system, having a relay and adjustable resistance in the line in combination with two shunt circuits, one around the relay and the other around said line resistance, and a double contact transmitter controlling said shunt circuits, whereby the operation of the transmitter increases or decreases the resistance in the line to operate a distant relay without affecting the relay at the transmitting station.

3. A duplex telegraph system, having a relay in circuit with a resistance, a shunt circuit through the relay but around said resistance, and another shunt circuit around the relay and containing a resistance in combination with a transmitter to open and close said two shunt circuits.

4. A duplex telegraph system, having a relay in circuit with a resistance, a shunt circuit around said resistance, a second shunt circuit around said relay and containing a resistance in combination with a transmitter having electromagnets and two armatures with front stops connected in said two shunt circuits to open and close these shunt circuits.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses.

JOHN J. GHEGAN.

Witnesses:

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HUBERT HOWSON.