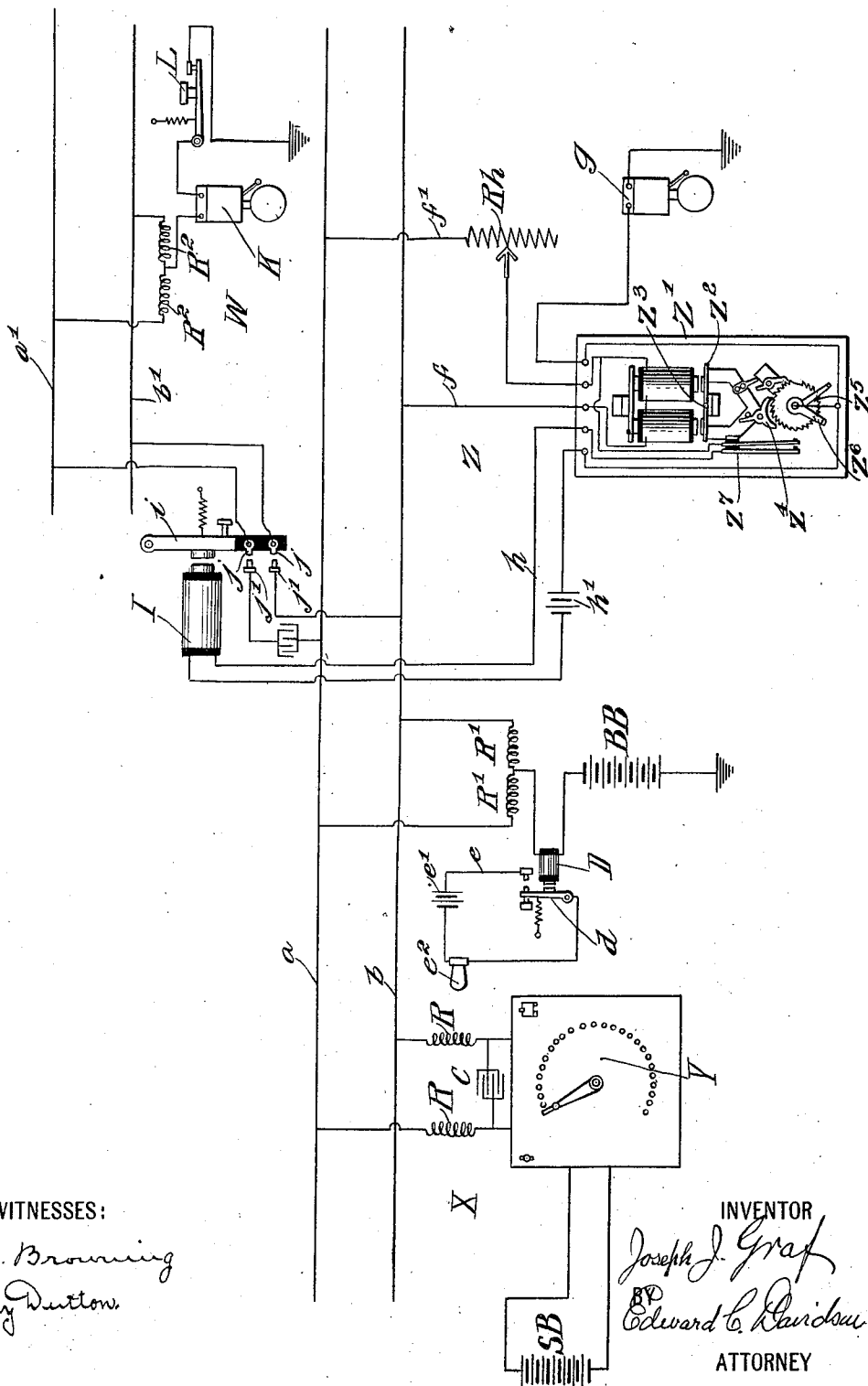


999,367.

WITNESSES:
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UNITED STATES PATENT OFFICE.

JOSEPH J. GRAF, OF SCRANTON, PENNSYLVANIA.

CALL SYSTEM FOR TELEPHONE-CIRCUITS.

999,367.

Specification of Letters Patent.

Patented Aug. 1, 1911.

Application filed May 26, 1910. Serial No. 563,519.

To all whom it may concern:

Be it known that I, JOSEPH J. GRAF, a citizen of the United States, residing at Scranton, in the county of Lackawanna, State of Pennsylvania, have invented a certain new and useful Improved Call System for Telephone-Circuits.

This invention relates primarily to those systems in which a number of telephone stations, each having its selector instrument, are connected with a main or central office, as, for instance, that of a train despatcher, where there is located selector apparatus by which any one or all of the outlying stations may be signaled for telephonic communication with the central office.

This invention comprises an organization hereinafter described in detail, whereby the selector apparatus of a sub-station may be operated from the central office to effect a connection with the main circuit of a normally disconnected outlying or special circuit.

The accompanying drawing is a diagrammatic illustration of the invention.

a, b, indicate the conductors of a twin wire telephone circuit. At the central office *X* there is bridged across this circuit the selector apparatus *Y* by which any one or all of the sub-stations may be signaled for telephonic communication. *SB* indicates the signaling battery or source of electrical energy. Each branch of this bridge circuit includes a retardation coil *R*, and between the selector apparatus *Y* and the retardation coils there is cross-connected a condenser *C*. Also at the central office, bridged across the main conductors, there is a second bridge circuit including two retardation coils *R'*, *R'*, and from between the retardation coils there is a connection to ground through an electromagnet *D* and battery *BB*. The armature lever *d* of the electromagnet *D* is normally retracted by its spring, and when attracted to its front stop closes a local circuit *e*, including a local battery *e'* and a signal device, as, for instance, a lamp or bell *e''*, the former being indicated. One sub-station *Z* is shown. It is bridged by conductors *f*, *f'*, across the main circuit. One of the bridge conductors is shown as including an adjustable resistance *R_h*, and each may, as usual, contain a retardation coil between which is connected an ordinary selector apparatus *Z'*; and, as is common, there may be a connection to

ground through a signal bell *g*. Connected with contacts of the selector apparatus *Z'* is a normally open local circuit *h*, including a local battery *h'* and an electromagnet *I*. Should the central office operator desire to close the local circuit *h*, for a purpose presently stated, the selector apparatus *Z'* is stepped around to such position that the contacts thereof with which the local circuit *h* is connected are closed. This may be done without signaling the station *Z*, as is well understood by those familiar with systems of selective signaling.

The electromagnet *I* has a pivoted armature lever *i* normally retracted by its spring and carrying two insulated contacts *j*, *j*, connected to conductors leading respectively to the conductors *a'*, *b'*, of a second telephone circuit. Opposite the insulated contacts *j*, *j*, are fixed contacts *j'*, *j'*, connected with conductors respectively joined to the circuit conductors *a*, *b*. When, therefore, the selector apparatus *Z'* is by a succession of impulses transmitted from the central office stepped around to position to close the local circuit *h*, magnet *I* is energized, armature lever *i* is attracted, and the second or outlying telephone circuit *a'*, *b'*, is connected with the telephone circuit *a*, *b*. Connected with the circuit *a'*, *b'*, are one or more local stations, of which but one *W* is indicated. At this station in addition to the telephone apparatus (not shown) there is connected to the line through retardation coils *R²*, *R²*, a grounded conductor including a signal device as a call bell *K* and a normally closed key *L*. When the outlying circuit *a'*, *b'*, has been connected with the main telephone circuit *a*, *b*, there will be established a circuit from earth at the station *W* to earth at the central office through the battery *BB*, and the call-bell *K* at the local station will continue to ring as long as this circuit is maintained. Also at the central office, the magnet *D* being energized, local circuit *e* will be closed and the signal device *e''* operated. The operator at *W* will therefore get a call signal, and the central office operator will be apprised that the proper connection has been made. The operator at station *W* may indicate to the central office that he is in receipt of the call, by opening his key *L*, when the signal device *e''* will cease to be operative.

The selector *Z'* may be of any suitable or appropriate type. It may have a rocking

polarized armature z^2 pivoted at z^3 and carrying a pivoted pawl z^4 that steps around a ratchet wheel z^5 whose shaft carries a contact arm z^6 that may be brought into engagement with a fixed spring contact arm z^7 . One terminal of local battery h' is connected to contact z^7 and the other to the shaft of ratchet wheel z^5 . When it is desired to open local circuit h' to disconnect the outlying circuit the selector devices Z' may be actuated to release ratchet wheel z^5 which will then be returned to zero or unison by the usual spring or in any known way.

I claim:

1. A telephone system comprising a main circuit, selective signaling apparatus and a source of energy bridged across the main circuit at the central office, a sub-station having a selector device also bridged across the main circuit, a normally open local circuit connected with said selector device and adapted to be closed thereby, a second telephone circuit and electromagnetic devices whereby the second telephone circuit is connected with the first one when said local circuit is closed, a signaling device and a normally closed key in a ground connection from said second named telephone circuit, a bridge connection at the central office across the first named telephone circuit, a ground connection therefrom including an electromagnet and a source of energy and a signal device controlled by said electromagnet.

2. A telephone system comprising a main circuit, selective signaling apparatus and a source of energy bridged across the main circuit at the central office, a sub-station having a selector device also bridged across the main circuit, a normally open local circuit connected with said selector device and adapted to be closed thereby and a second telephone circuit and electromagnetic devices whereby the second telephone circuit is connected with the first one when said local circuit is closed.

In testimony whereof, I have hereunto subscribed my name.

JOSEPH J. GRAF.

Witnesses:

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THEO. W. KELSEY.