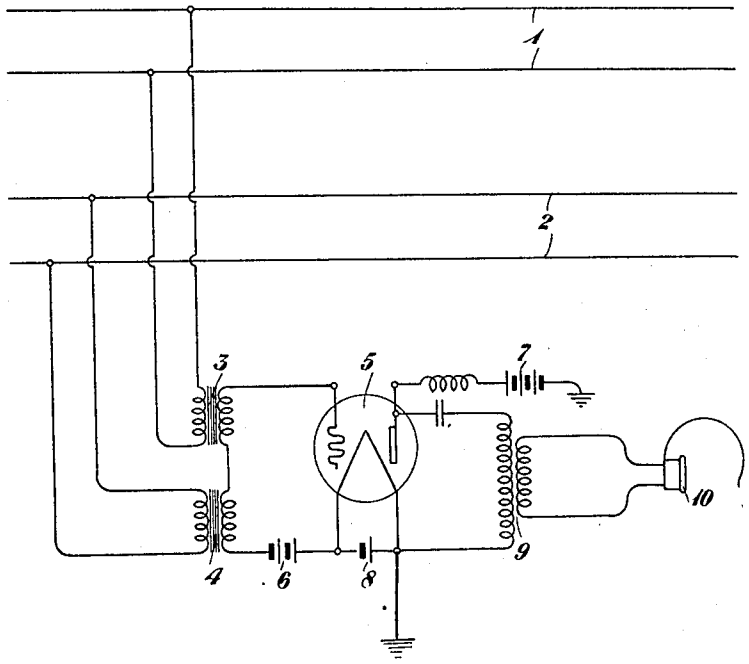
G. CRISSON.

SERVICE OBSERVING SET.

APPLICATION FILED NOV. 24, 1920.

1,412,103. Patented Apr. 11, 1922.



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UNITED STATES PATENT OFFICE.

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SERVICE-OBSERVING SET.

1,412,103. Specification of Letters Patent. Patented Apr. 11, 1922.

Application filed November 24, 1920. Serial No. 426,271.

To all whom it may concern:

Be it known that I, GEORGE CRISSON, residing at Hackensack, in the county of Bergen and State of New Jersey, have invented certain Improvements in Service-Observing Sets, of which the following is a specification.

This invention relates to communication systems and more particularly to arrangements for observing the service on such systems.

In general, it is the purpose of the invention to provide a service observer's set, or listening in apparatus, which is adapted to be used simultaneously with a plurality of circuits and which may be associated with such circuits in a manner so that there will be no interference, such as cross-talk, between said circuits. Furthermore, with the arrangements of this invention a considerable reduction in apparatus may be effected. Other objects and purposes of the invention will appear more fully from the detailed description hereinafter given.

In the arrangements of this invention, the operator's listening set, or service observing set, is associated with the output circuit of a device, such as an amplifier, having a substantially infinite input impedance. Any type of device or amplifier might be used which would have substantially infinite input impedance and would require very little input energy for its operation and would absorb a negligible amount of energy from the line. The well-known vacuum tube amplifier is a suitable device for use in this connection. In the input circuit of the amplifier there is provided a separate transformer for each circuit upon which service observation is to be made at the same time. The line windings of each of these transformers are bridged across the corresponding line, while the secondary windings are connected in series in the grid circuit of the vacuum tube amplifier. The observing operator can then listen to what is taking place upon all of the circuits at once and no interference between the talking circuits will be produced, since the grid circuit of the vacuum tube has a substantially infinite impedance and no current will flow through any of the input transformers due to voltages set up in any other input transformer.

The invention may be more fully understood from the following description of its operation and by the accompanying drawing in which is illustrated a preferred form of the invention. In the drawing there is shown a plurality of transmission circuits such as 1 and 2. A service observer's arrangement, or listening in device, is shown associated with these circuits. The listening in device comprises an operator's receiver 10 associated through the transformer 9 with the output circuit of a vacuum tube amplifier 5. The vacuum tube amplifier is well known in the art and comprises a grid, a filament and a plate, associated with which are the grid battery 6, the plate battery 7 and the filament battery 8. Associated with the grid circuit of the amplifier are the transformers 3 and 4. The primary windings of these transformers are bridged across the lines 1 and 2 respectively, and the secondary windings thereof are connected in series in the grid circuit of the amplifier. While only two transformers, such as 3 and 4, and two transmission lines, such as 1 and 2, have been illustrated, it is understood that the service observer's set might be associated with additional lines by providing additional transformers in the manner shown. When an electromagnetic wave arrives over any one of the transmission lines such as 1 or 2, its voltage is applied by the corresponding input transformer, such as 3 or 4, to the grid circuit of the tube 5 and is so repeated into the receiver circuit of the observing set. The observing operator can then listen to what is taking place upon all of the circuits at once. It is pointed out that no interference such as cross-talk can take place between circuits 1 and 2 with the arrangements of this invention as the grid circuit of the vacuum tube has a substantially infinite impedance and no current can flow through any one of the input transformers such as 3 and 4 due to voltages set up in another of such input transformers.

The advantages of the arrangements of this invention are, in general, that one amplifier and listening set can be used simultaneously upon as many different circuits as desired. This would not be possible with the observing circuits of the prior art, which consisted essentially of a step-down transformer and receiver, because the receiver has a finite impedance and requires a finite amount of energy for its operation so that any interconnection of the secondary wind-

ings of the transformers would lead to interference, such as cross-talk, between the various circuits subject to observation.

While the arrangements of the invention have been disclosed as embodied in certain specific arrangements which are deemed desirable, it is understood that they are capable of embodiment in many and widely varied forms without departing from the spirit of the invention as defined in the appended claims.

What is claimed is:

1. A plurality of transmission lines, a circuit including receiving apparatus associated with said lines, and a unilateral vacuum bulb device in said circuit between said receiver and said lines, said device having substantially an infinite input impedance.

2. A plurality of transmission lines, a circuit including receiving apparatus associated with said lines, and a vacuum bulb amplifier having substantially an infinite input impedance in said circuit, the output circuit of said amplifier being associated with said receiving apparatus and the input circuit of said amplifier being associated with said lines.

3. A plurality of transmission lines, a circuit including receiving apparatus associated with said lines, and a vacuum bulb amplifier having substantially an infinite input impedance in said circuit, the output circuit of said amplifier being associated with said receiving apparatus and the input circuit of said amplifier being associated with said lines through a plurality of transformers, the primary winding of one of each of said transformers being bridged across one of each of said transmission lines and the secondary windings of said transformers being connected in series in the input circuit of said amplifier.

4. A plurality of transmission lines, a circuit including receiving apparatus associated with said lines, and a unilateral vacuum bulb device having substantially an infinite input impedance in said circuit, the output circuit of said device being associated with said receiving apparatus and the input circuit of said device being associated with said lines through a plurality of transformers, the primary winding of one of each of said transformers being bridged across one of each of said transmission lines and the secondary windings of said transformers being connected in series in the input circuit of said device.

5. A plurality of transmission lines, a circuit including receiving apparatus associated with said lines, and a unilateral vacuum tube device in said circuit between said receiving apparatus and said lines, said device absorbing a negligible amount of the energy transmitted over said lines.

In testimony whereof, I have signed my name to this specification this 23rd day of November, 1920.

GEORGE CRISSON.