

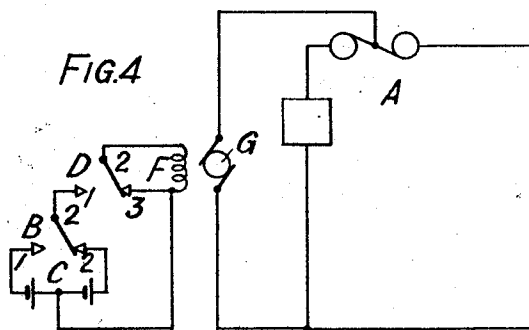
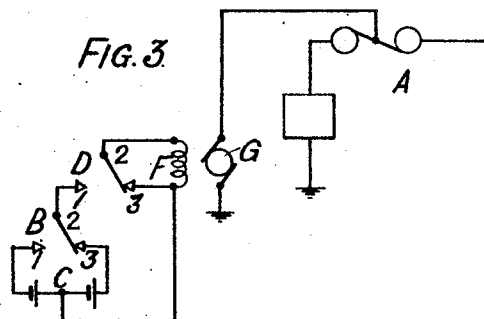
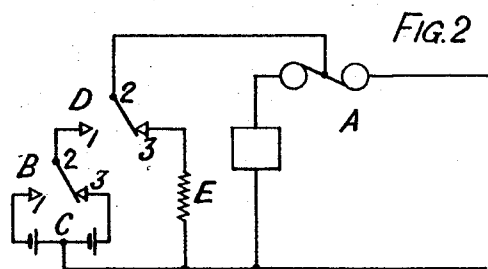
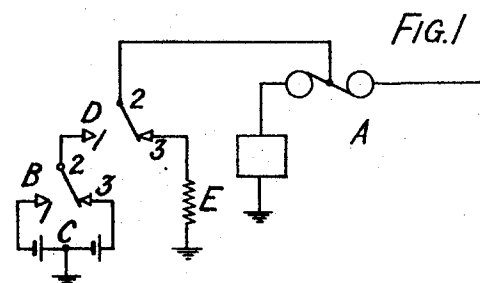
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DUPLEX TELEGRAPH SYSTEM

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DUPLEX TELEGRAPH SYSTEM

Application filed September 29, 1930, Serial No. 485,173, and in Great Britain September 4, 1930.

This invention relates to double current duplex telegraph systems and has for its main object to effect economy of the signalling current during idle periods and without disturbing the duplex conditions.

Duplex telegraph systems may be defined as systems in which signalling can be effected either simultaneously or alternately in opposite directions between two stations over a single connecting line, the methods of connection generally adopted being known as bridge or differential connections respectively. Double current working is defined as signalling by means of currents of opposing polarities as distinguished from single current working in which the signal elements are delimited by intervals of current and no current respectively.

The invention is more particularly applicable to telegraph systems in which printing apparatus working on the start-stop principle is employed, by which is meant that class of apparatus in which all operations necessary for the transmission or reception of each character are effected in one cycle of operations after which the apparatus remains at rest until the next character is transmitted. Not only is the means employed for attaining the object of the invention particularly applicable to telegraph apparatus working on the start-stop principle, but it is in telegraph systems employing apparatus working on this principle that the invention appears to have its greatest measure of utility. It will be understood, however, that the invention is not limited to these cases.

In cases where it is necessary to transmit only in one direction at a time, but where it may be desirable to change the direction of transmission at any time, it is usual to arrange transmitting and receiving apparatus at both ends of the line as for simplex working for each direction of transmission and for a change-over switch to be operated by the transmitting apparatus at each end. When the transmitting apparatus at either end of the line is not signalling the associated change over switch is in one position and earths the line through the receiving apparatus which is then ready to respond to signals received

over the line. Directly, however, the transmitting apparatus commences to signal, the switch is operated to the opposite position which disconnects the receiving apparatus from the line and connects the transmitting contacts thereto in lieu. On termination of signalling, the line is again earthed through the receiving apparatus.

In a start-stop telegraph transmitter in which a cam shaft is clutched to a driving member for one revolution for each signal transmitted, the simplest manner of operating the change over or send-receive switch is by means of a cam on the cam sleeve, which immediately upon commencing rotation and before the transmission of the first or starting element of the signal by the signalling contacts, effects the change over of a contact tongue. Just before the transmitter cam shaft is arrested and after termination of the signal, the contact tongue is returned by the cam. There are other methods of control of a send-receive switch also known in the art to secure this effect, but which need not here be detailed. These methods vary according to whether the switch is to be adapted to a keyboard controlled transmitter or a perforated tape controlled transmitter. Any method of control of a switch by telegraph transmitting apparatus to secure a similar effect may be adapted for the purpose of the present invention and no claim is made to any of these arrangements as thus used for effecting a changeover from receive to send in simplex systems.

According to the present invention switching means is associated with and operated by signal transmitting apparatus in double current duplex telegraph systems to dissociate signalling current from the line circuit during idle periods without disturbing the duplex conditions.

The invention provides means for reducing considerably the consumption of signalling battery power in double current duplex telegraph systems which are only used intermittently for the transmission of signals. In telegraph systems arranged according to the bridge or differential duplex conditions, it is known that the source of signalling current

at each station forms part of the line circuit to which the artificial line of the other station is required to be balanced. When it is desired to disconnect the signalling battery, therefore, it may be necessary to substitute an equivalent resistance or effect other switching operations in order to maintain duplex conditions.

In the accompanying drawings, Figure 1 shows diagrammatically the invention as applied to a single line with earth return, and Figure 2 as applied to a complete metallic loop. Figures 3 and 4 depict another mode of application as used in conjunction with a signalling generator known to the art as "keying in the field", Figure 3 being the application to a single line and Figure 4 to a metallic loop.

In the drawings, duplex connections will be recognized at A, the signal transmitting contacts B being operable by signal transmitting means (not shown), C is the source of signalling current and D represents switching means associated with and operable by the transmitting means as previously described.

In Figures 1 and 2, E represents a resistance. Immediately prior to signalling, contact lever D2 is actuated to contact D1 and connects the signal contacts to the duplex connections and remains thereon during signalling. On termination thereof, D1 returns to contact D3 thus disconnecting the source of signalling current C and maintaining the duplex conditions through resistance E.

In Figures 3 and 4, the source of signalling current C is employed to energize the field magnet F of a signal current generator G through the signal transmitting contacts B and switch means D. In this case, contact lever D2 is actuated to contact D1 for effecting the transmission of signals, but on termination of signalling returns to D3 and short circuits the field magnet F.

In all cases shown, it will be seen that the principle is the same. The methods and means for carrying it out, however, may vary considerably, but it is thought that from the foregoing this will be apparent to those acquainted with the art without the necessity for further description.

What is claimed is:

1. In a double current duplex telegraph system, a duplex line circuit having at one end thereof signal transmitting apparatus, a source of signalling current, and switch means associated with and operated by said signal transmitting apparatus to dissociate said source of signalling current from the line circuit during idle periods without disturbing the duplex conditions.

2. In a double current duplex telegraph system, a duplex line circuit having at one end thereof, signal transmitting apparatus, signal contacts controlled thereby, a source

of signalling current, and a contact lever actuated by said transmitting apparatus to connect said signal contacts in circuit during signalling periods and to disconnect said signal contacts whilst maintaining duplex conditions during idle periods.

3. In a double current duplex telegraph system, a duplex line circuit having at one end thereof signal transmitting apparatus, signal transmitting contacts, a contact lever actuated by said signal transmitting apparatus on commencement of signalling to connect said signal transmitting contacts in circuit, and a balancing resistance connected in circuit in place of said transmitting contacts on termination of signalling.

4. In a double current duplex telegraph system, signal transmitting apparatus, signal transmitting contacts, a signal current generator and a contact lever actuated by said signal transmitting apparatus on commencement of signalling to connect said signal transmitting contacts in circuit with the field magnet of said signal current generator and to disconnect said transmitting contacts and short circuit said field magnet on termination of signalling.

In witness whereof I hereunto subscribe my name this twelfth day of September, 1930.

RONALD GEORGE GRIFFITH.