

FIG. 3,052.—Elementary diagram showing a simple short line closed circuit system. It is called closed system from the fact that the circuit is normally closed with current on the line, that is to say, when not in operation the switches are closed and current flows which energizes the magnets and holds the instrument armatures in the down position. This necessitates the use of a closed circuit cell as for example the crow foot gravity type which is capable of supplying a very weak current for a long duration of time.

Ques. What is the circuit shown in fig. 3,052 called, and why?

Ans. It is called a closed circuit, because both switches are kept closed except during operation, when the sender's switch remains open.

Ques. Describe a simple open circuit system.

Ans. As shown in the elementary diagram, fig. 3,053, the only instruments necessary are a key with insulated contacts, a sounder, and cell at each station. One insulated contact of each key is connected to the cell, and the other insulated contact is connected in series with the sounder and the latter grounded as shown. The base of each key is connected to the line.

In operation only the battery at the send-

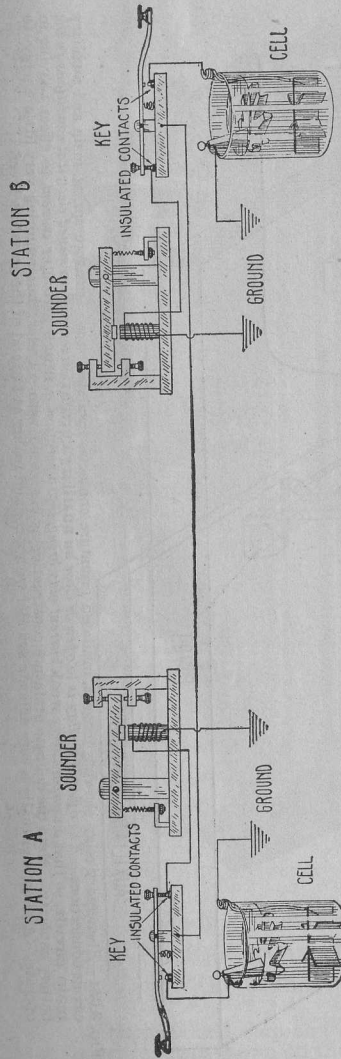


FIG. 3,053.—Elementary diagram showing a simple short line open circuit system. In Europe this system is in general use; it consists essentially of so arranging the apparatus that the battery shall only be placed to the line when a message is being transmitted. A main battery is necessary at each station, whereas in the closed system, employed in America, main batteries are required only at the terminal stations. An advantage of the open circuit system is that when not in use, the battery is not required to supply current to the line; another advantage is that the resistance of the sounder (or relay) is not always in the circuit since the closing of a key cuts out the relay. On relay lines local sounders or registers are provided. In some cases a "tailpiece" galvanometer is placed in the main line at each station to indicate to the operator the condition of his transmitted signals, etc.

Ques. What is accomplished by the use of relays on telegraph lines of moderate or long distance?

Ans. It reduces considerably the battery capacity required.

Ques. What is the object of a relay?

Ans. Its function is to act as a sort of electrical multiplier, that is to say, it enables a comparatively weak current to bring into operation a much stronger current.

Ques. What is a relay?

Ans. In general, a relay is a device which opens or closes an auxiliary circuit under predetermined electrical conditions in the main circuit.

ing station is available, hence twice the battery capacity is required as compared with the closed circuit system. Ordinary keys may be used by insulating the back contact of each.