

How a Small Telephone System is Operated

(From "Western Electric News")

THE Western Electric Company makes telephone switchboards ranging in size from "ponies," that connect with only ten subscribers, up to "multiples," that will accommodate more than ten thousand lines each.

Most of us living in the cities and larger towns are familiar with only one kind of telephone—that known as the "central battery" type, on which the mere act of taking the receiver from the hook summons the operator at the exchange. But there is another type, which, while it was formerly used all over the country, is now confined principally to the smaller towns and rural centers. This is the "magneto" system, on which, in order to call "Central," it is necessary to turn a crank before taking the receiver off the hook.

We are going to try and describe, as simply as possible, the operation of a telephone system employing this "magneto" type of instrument. In order to do this we shall trace the course of a message from one subscriber, through the exchange, to another subscriber, showing you just

shows the jacks for each line (105 in this case), with the ball signal for each line just above the jack.

Answering a Call by the Operator

Ranged along the front of the switchboard below the jacks, on a horizontal board known as the keyshelf, are two rows of "plugs," which are fastened on the ends of flexible cords. The cords are held down below the keyshelf by pulley weights, like those used on window cords. A "plug" is an apparatus something like a short pencil stub, which can be inserted in a jack to make connections between the two wires of the jack and the two wires in the cord.

The back row of plugs are called "answering" plugs, the front row "calling" plugs. Each answering plug is connected, through its cord, with the calling plug in front of it, the two together forming a "pair of cords."

When Central sees the red signal over your number she picks up any one of the answering

She then pulls the key-handle toward her for a moment, and at the same time, with her other hand, turns the crank of a hand generator in the switchboard (this may be seen at the right, under the front edge of the keyshelf, in the picture). This rings the bell of telephone No. 49.

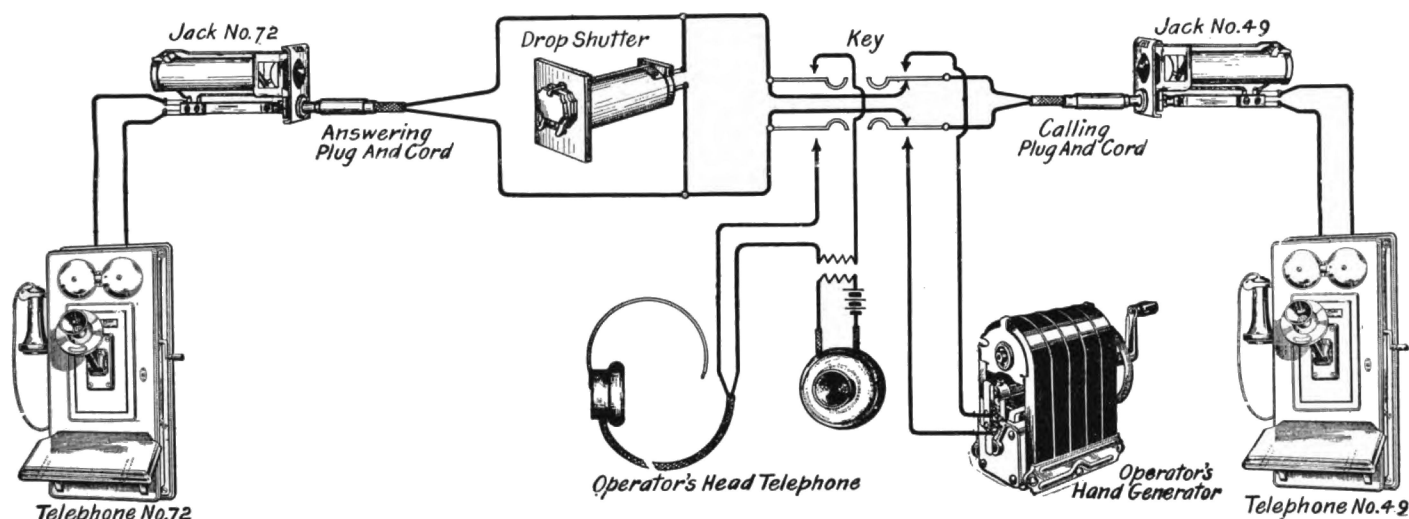
If you will refer again to the diagram you will notice that when the key-handle is pulled forward the calling cord is disconnected from the answering cord and connected with the operator's hand generator.

Conversation Between Subscribers

As soon as Central has "rung up" No. 49, she allows the key-handle to spring back to its normal vertical position, and you are in direct connection with telephone No. 49, as shown in the diagram. You are now ready to begin your conversation.

Ringing Off

When you have finished your conversation, you hang up the receiver and turn the crank to "ring



what happens from the time you turn the crank to call Central to the time when you hang up the receiver and "ring off."

Calling "Central"

Let us suppose that you live in a small country town; that your telephone number is 72, and that you want to call up someone whose number is 49. You go to the telephone, turn the crank, and take down the receiver.

Now look at the diagram. At the left you will see your telephone, with the two wires that connect it with a socket or "jack" in the exchange switchboard, marked with your number, 72. Just above this jack you will see a small ball with the black side turned outward, facing the operator, which is its usual position. But when you turned the crank you worked a small dynamo inside the body of your telephone instrument (this dynamo is termed a "hand generator"). This created a current of electricity which passed over the wires to the exchange, and made the ball swing around until its red side was exposed (white in the diagram), thus calling Central's attention to your signal. The picture of the No. 1220 switchboard

plugs and inserts it into the jack just below the signal—your jack, No. 72. This turns the ball back, so that its black side is again exposed, and also allows the current from your telephone to pass into that particular pair of cords.

On the keyshelf, in front of the plugs, is a row of levers, or handles, known as "keys," one belonging to each pair of cords. Central next presses back the key-lever corresponding to the pair of cords whose answering plug is in jack No. 72. This operation allows the current from your telephone to pass through the answering cord to the telephone she wears strapped to her head. She asks you, "Number, please?"

You say, "Give me four-nine."

If you will now again refer to the diagram you can trace the current from your telephone to your jack, through the answering plug and cord, and through the key to the operator's head-telephone.

Ringing the Desired Subscriber

Central, leaving the answering plug in jack No. 72, now picks up the corresponding calling plug and inserts it in jack No. 49, thus connecting you with the line of the person you asked for.

off." This time the current from your hand generator, instead of moving the ball (over jack No. 72 this ball is "cut off" by the inserted plug), passes on through the answering plug and drops a small shutter that is set into the switchboard below the banks of jacks. There is one of these shutters for each pair of cords (the picture shows a pair of cords in use, with their corresponding shutter dropped for a "ring off" signal). This dropping of the shutter acts as a signal to the operator, who, first making sure that you are through talking, pulls the answering plug out of jack No. 72, the calling plug out of jack No. 49, and resets the drop shutter.

You and party No. 49 are now disconnected, and will remain so until either of you sends or receives another message.