

**Watson, ... if I can get a mechanism which will make a current of electricity vary in its intensity, as the air varies in density when a sound is passing through it, I can telegraph any sound, even the sound of speech.**

**Alexander Graham Bell**



**Arizona State University**  
**SES 194**

# **Energy in Everyday Life**

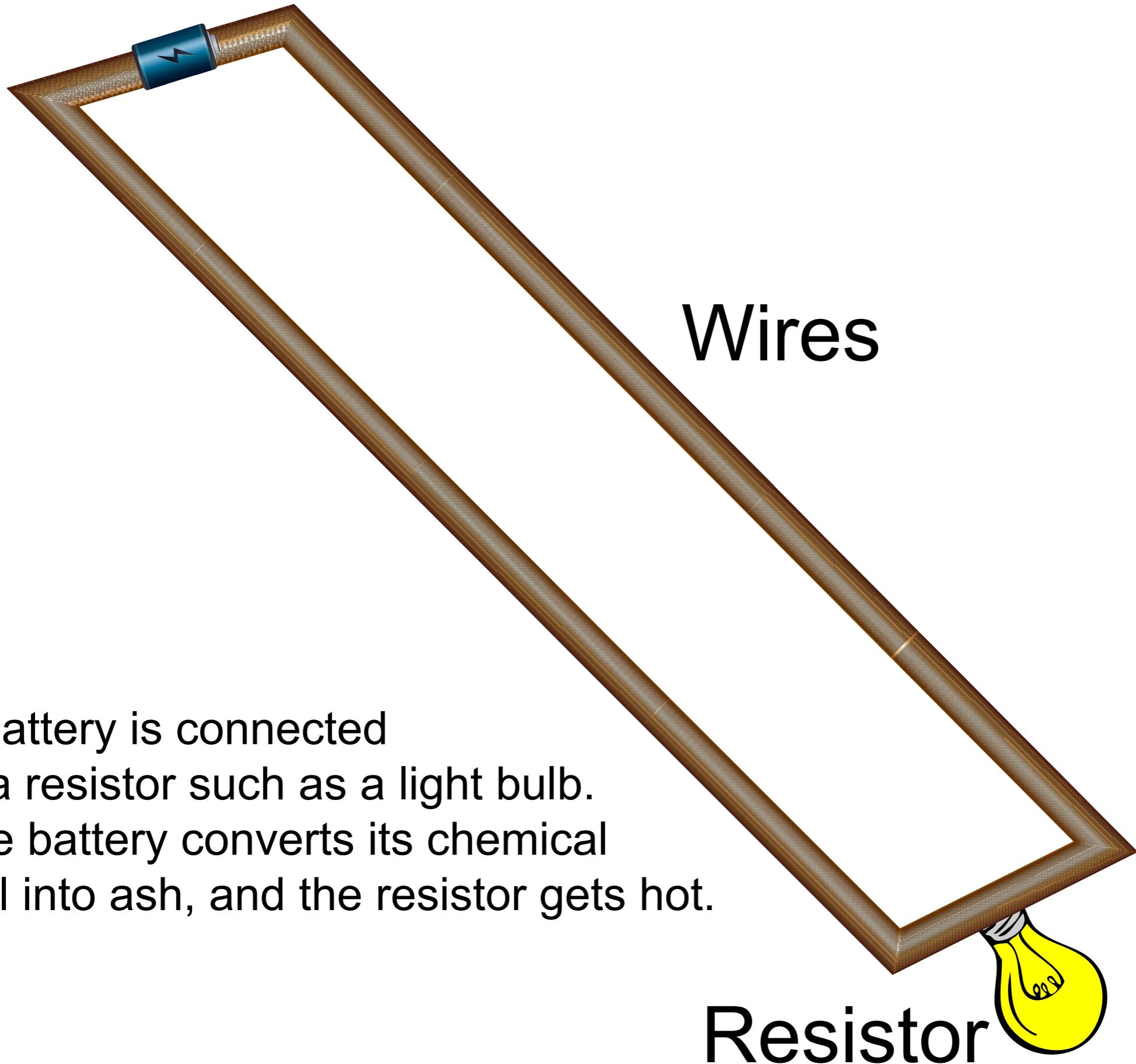
## **Energy Flow In A Circuit**

**Frank Timmes**

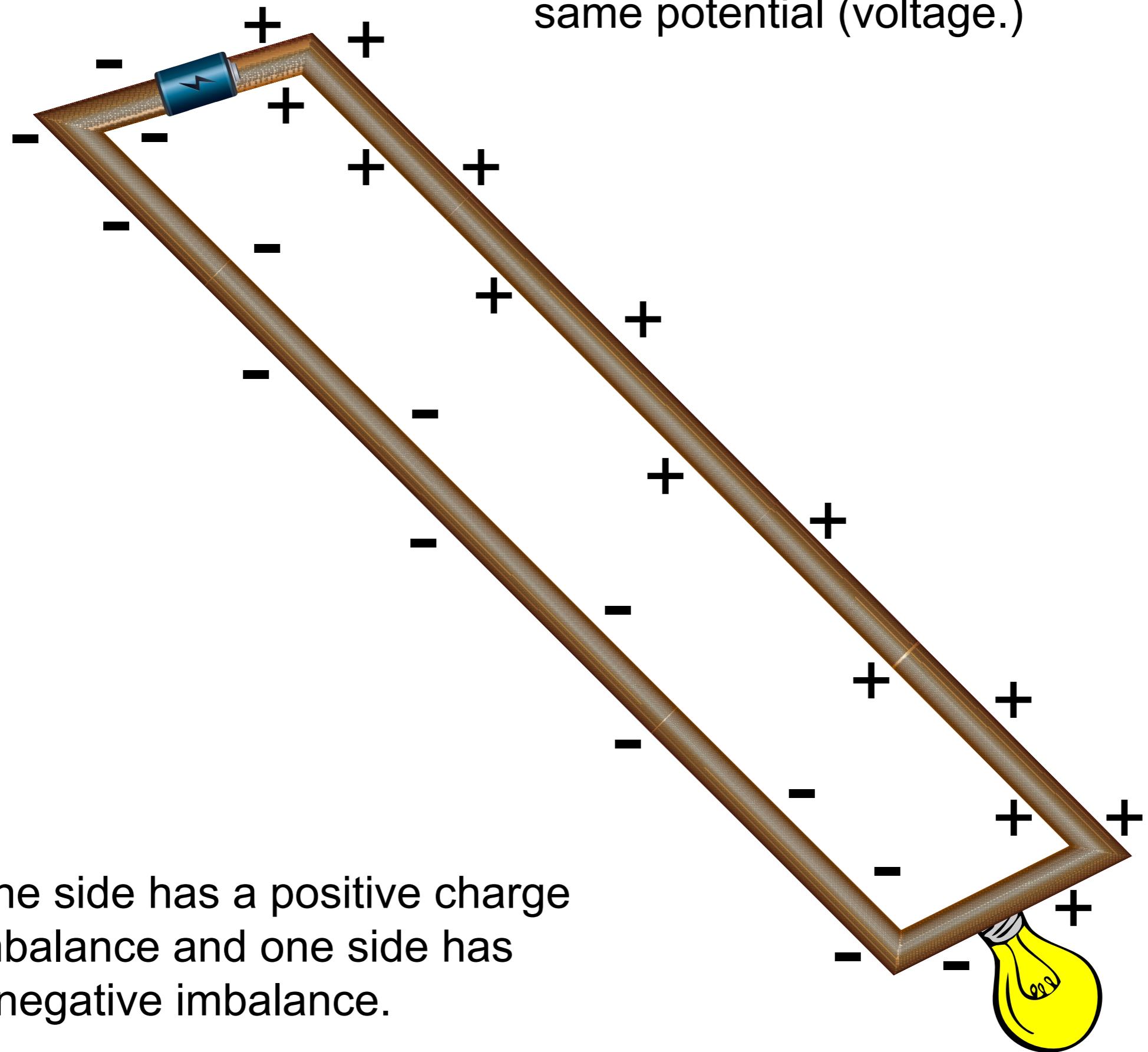
**[ftimmes@asu.edu](mailto:ftimmes@asu.edu)**

**Let's discuss how energy flows in a circuit.**

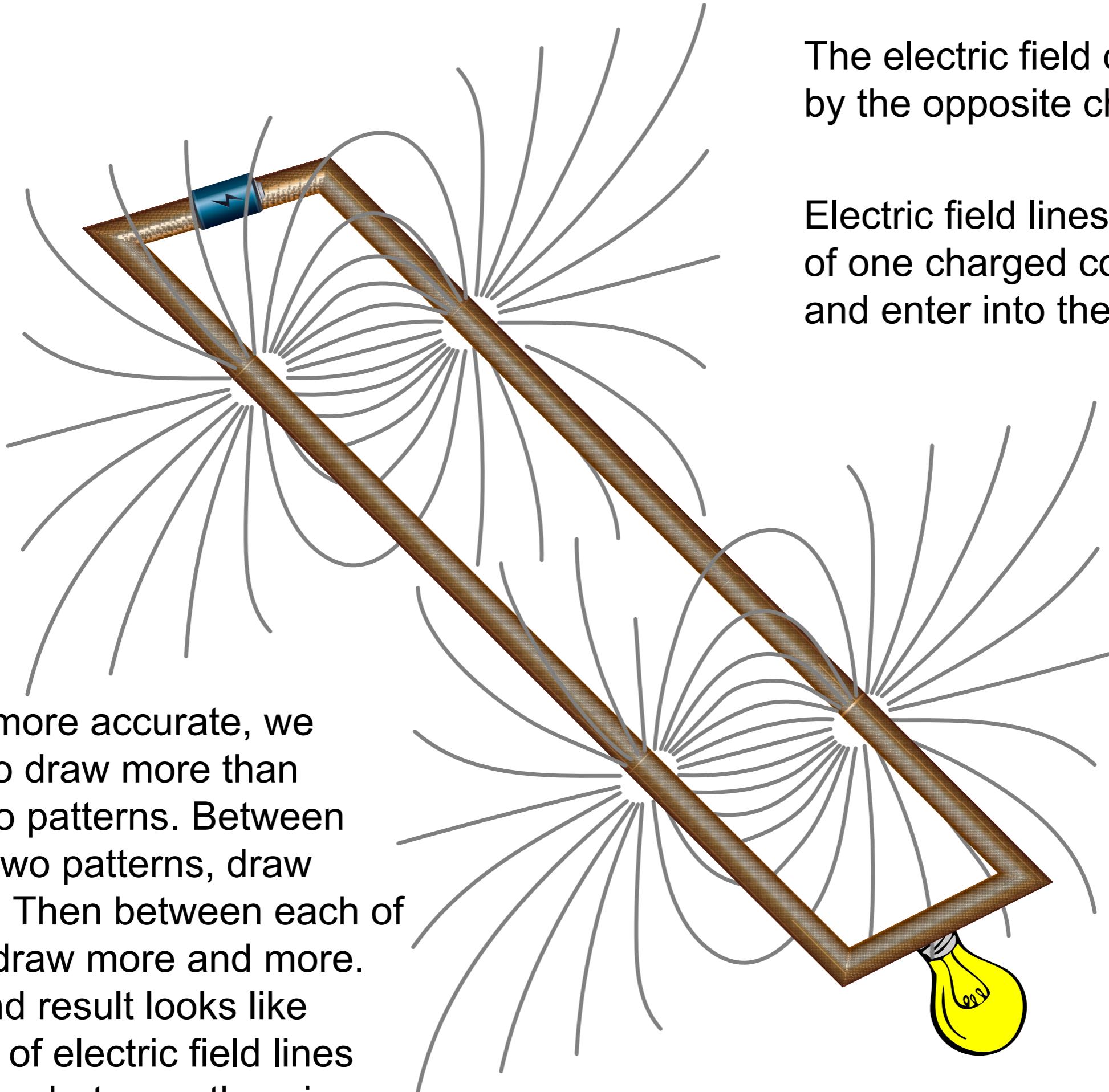
# Battery



Everything connected to one battery terminal acquires the same potential (voltage.)



One side has a positive charge  
imbalance and one side has  
a negative imbalance.

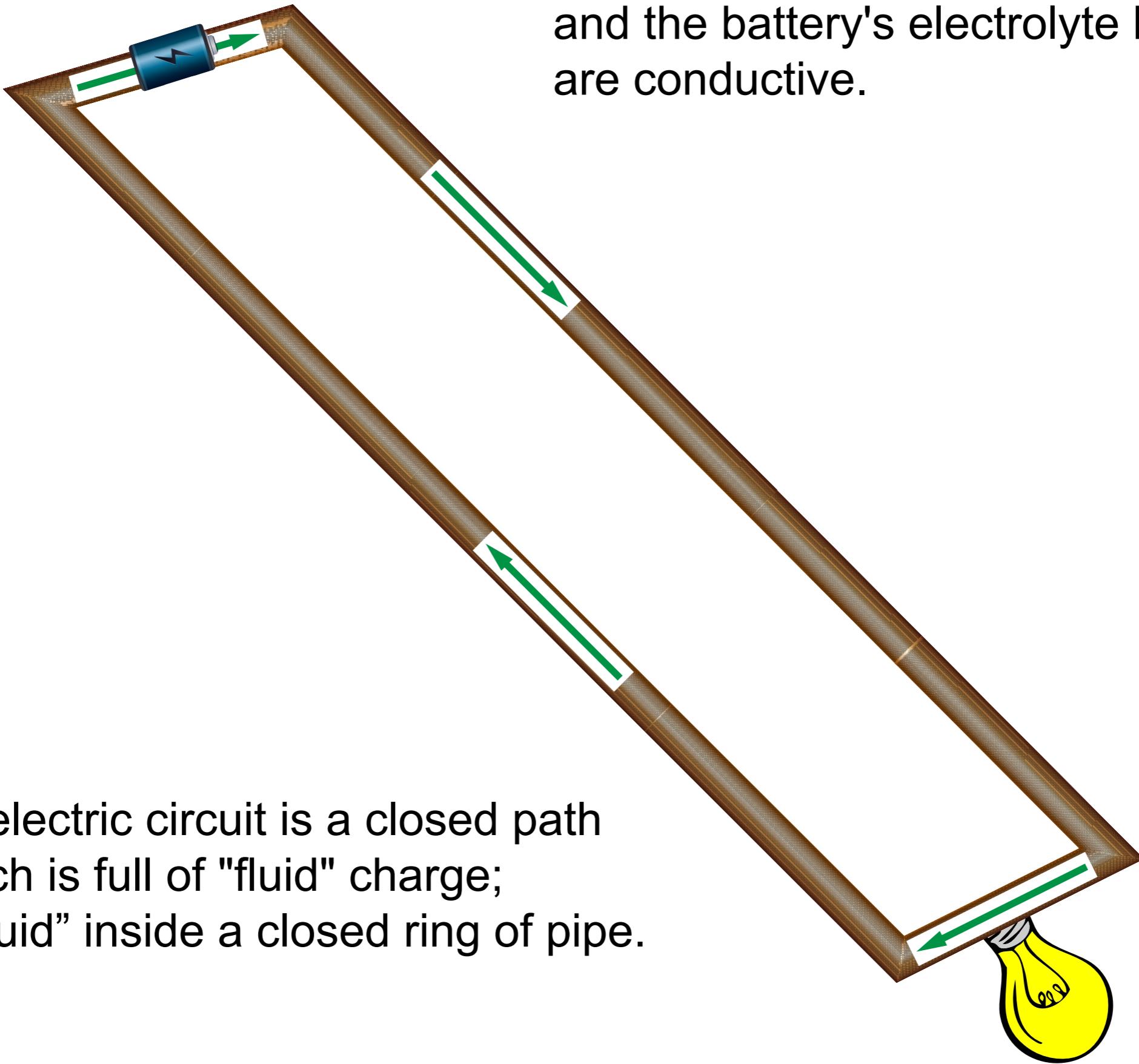


To be more accurate, we need to draw more than just two patterns. Between these two patterns, draw a third. Then between each of those draw more and more. The end result looks like sheets of electric field lines with arcs between the wires.

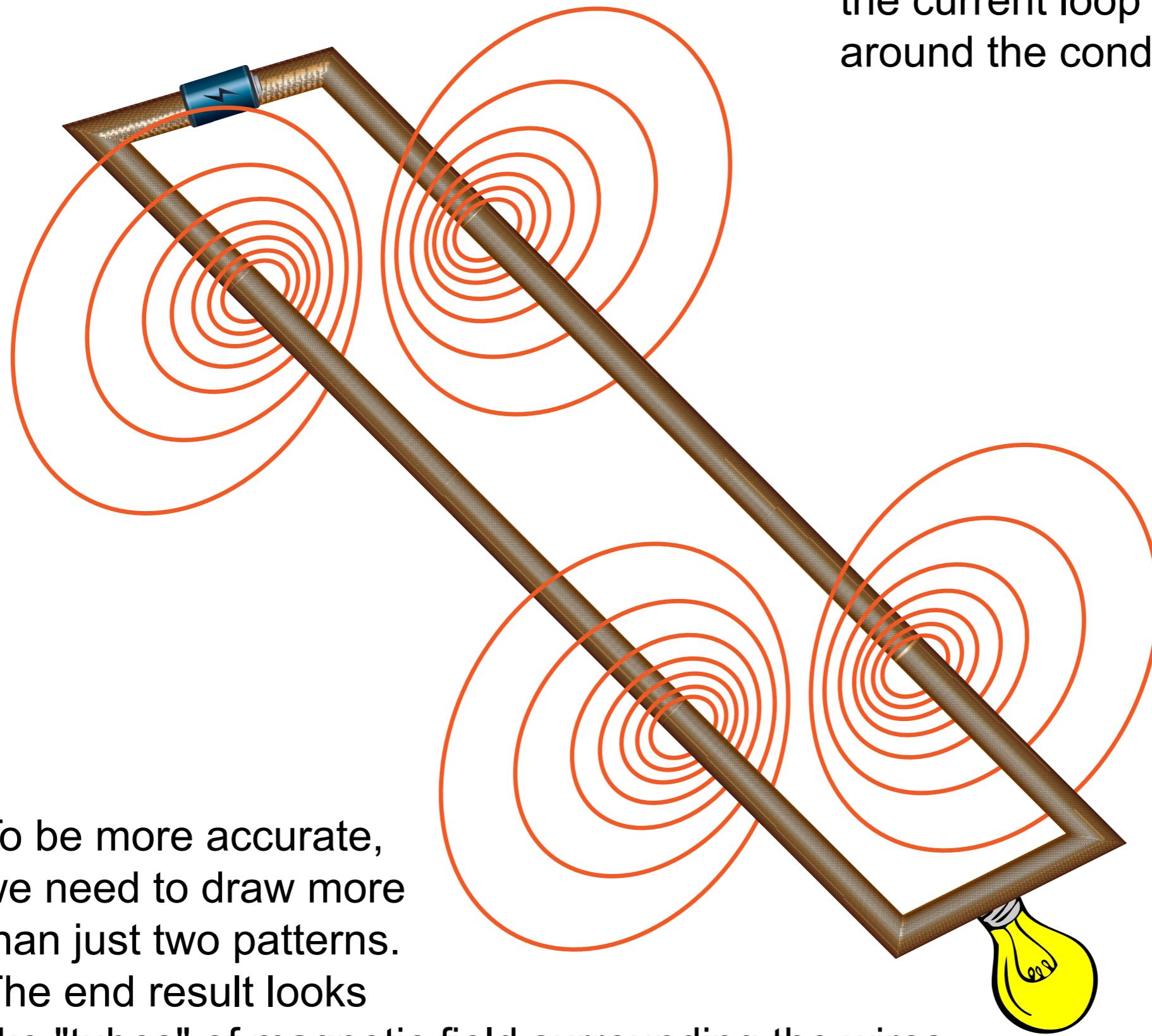
The electric field caused by the opposite charges.

Electric field lines exit out of one charged conductor and enter into the other.

An electric circuit is a closed path which is full of "fluid" charge; "fluid" inside a closed ring of pipe.

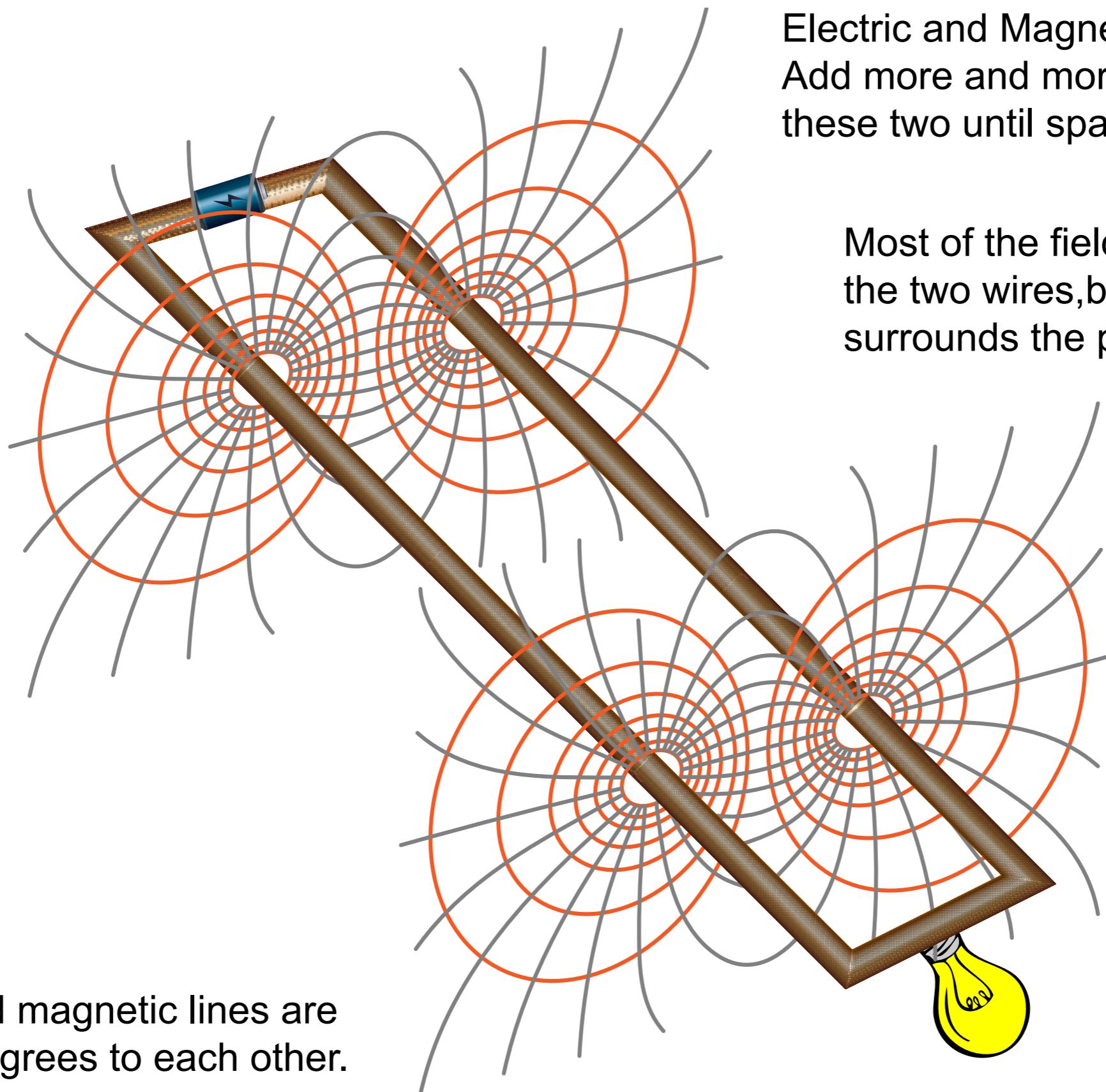


All conductive materials contain movable charges. The resistor and the battery's electrolyte both are conductive.



To be more accurate,  
we need to draw more  
than just two patterns.  
The end result looks  
like "tubes" of magnetic field surrounding the wires.

The magnetic field caused by  
the current loop forms rings  
around the conductors.



Electric and Magnetic fields together.  
Add more and more patterns between  
these two until space is filled

Most of the field lines are between  
the two wires, but quite a bit also  
surrounds the pair as a whole.

The electric and magnetic lines are  
always at 90 degrees to each other.

