ELECTRICITY FOR ARC WELDING (SMAW, GMAW, GTAW, FCAW)

- ELECTRICITY FLOWING THROUGH A CONDUCTOR IS CONVERTED INTO OTHER FORMS OF ENERGY, SUCH AS HEAT, LIGHT OR MOTION.
- ARC WELDING IS POSSIBLE BECAUSE THE FLOW OF ELECTRICITY IS CONVERTED INTO HEAT, WHICH MELTS THE BASE METALS AND FILLER MATERIAL.

- ELECTRICITY FLOWS IN A CLOSED CIRCUIT AND DEPENDS ON 4 COMPONENTS:

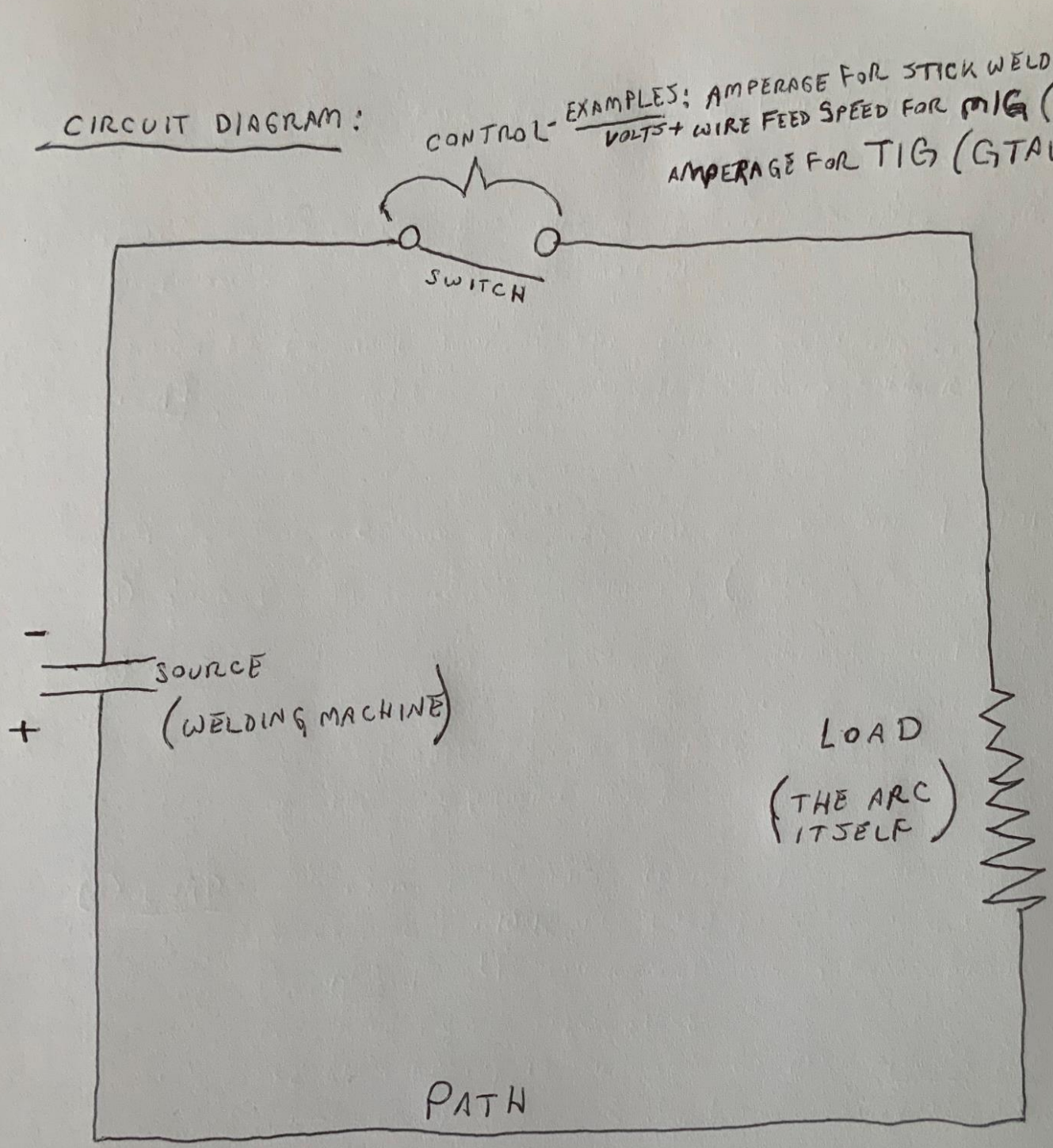
① SOURCE - TO GENERATE ELECTRICITY (WELDING MACHINE)

② PATH - CONSISTS OF CONDUCTORS THAT DIRECT THE FLOW OF ELECTRICITY THROUGH THE CIRCUIT. IN ARC WELDING, THE WORK CABLE AND ELECTRODE CABLE PROVIDE THE PATH. THE LENGTH AND DIAMETER OF CABLES DETERMINE THE AMOUNT OF ELECTRICITY THEY CAN CARRY.

③ LOAD - THE LOAD TRANSFORMS ELECTRICITY INTO HEAT, LIGHT, OR MECHANICAL MOTION. THE LOAD IN A WELDING CIRCUIT IS THE ARC ITSELF, WHERE ELECTRICITY FLOWS FROM THE ELECTRODE TO THE WORK PIECE.
THE ELECTRICITY IS TRANSFORMED INTO INTENSE HEAT THAT MELTS THE BASE METALS AND FILLER MATERIAL, THEREBY FORMING THE WELD.

④ CONTROL - THIS ADJUSTS THE FLOW OF ELECTRICITY. ARC WELDING SOURCES (THE WELDING MACHINE) USE CONTROLS SUCH AS CURRENT (AMPS), VOLTAGE, AND WIRE FEED SPEEDS TO CONTROL THE ARC.

CIRCUIT DIAGRAM:



EXAMPLES: AMPERAGE FOR STICK WELDING (SMAW)
VOLTS + WIRE FEED SPEED FOR MIG (GMAW)
AMPERAGE FOR TIG (GTAW)

ELECTRICITY FLOWS FROM THE POWER SOURCE (WELDING MACHINE), TO THE ELECTRODE, ARCS TO THE WORKPIECE, AND BACK TO THE POWER SOURCE, OR VICE VERSA.