

OPERATING INSTRUCTIONS

Climbing Arc No. 32244

1. Introduction

The Climbing Arc can be used for two different experiments: the familiar "Jacob's Ladder" demonstration and a simulation of the fixation of nitrogen by lightning.

2. Description

Our Climbing Arc is contained in a plastic cylinder that is mounted to a plastic platform by a sturdy circular metal cap. Three "stilts" (metal screws surrounded by clear plastic tubes) provide a 1 1/4" spacing between the platform base and a bottom wooden base with rubber feet. There is a hole in the center of the plastic platform to allow release of gas pressure in the cylindrical tube. MIKE, IS THIS THE PURPOSE OF THE HOLE, OR IS TERE SOME OTHER REASON FOR ITS EXISTENCE? A metal top cap completes the tube arrangement: It has a center hole with included rubber stopper.

The Climbing Arc's electrodes are connected by metal strips to two binding posts on the plastic platform base. You have an easy connection for your power supply. You will need appropriate connecting leads. If you are using our 30164 solid-State Induction Coil, you will need two banana plug /spade lead connectors. You can assemble them from our 30469 Universal Test Lead Kit. ARE THESE OK—COIL ON PG 252 NEW CATALOG—LEADS PAGE 615

A glass escape tube and a rubber stopper to hold the tube are included for the fixation of nitrogen demonstration.

You will need a power supply to run both demonstrations. Our 30164 Solid State Induction Coil will provide DOES IT PROVIDE?the necessary 10,000VAC for a dramatic run. A standard luminous (neon sign) tube also works very well, or you may use Tesla coils.

3. Operation

You must adjust the gap at the lower end of the horns, for whatever power supply you choose to use. A gap of about 1/4" is correct for 10,000 volts and can be obtained by rotating the horns. The point is, the gap at the lower end of the horns should be a distance for a sufficient voltage to start the arc; and yet the gap must be large enough so that the arc will rise once it has been established. The 30164 Solid-State Induction Coil has sliding rods under spring tension to adjust the gap.

Jacob's Ladder Demonstration: It is not necessary to stopper the plastic tube. Adjust the gap of the horns as above prior to the actual demonstration. Start your power supply. You will see a dramatic sparking as the arc between the electrodes ascends.

MIKE — ANY CAUTIONS OR TROUBLE-SHOOTING?

Fixation of Nitrogen: Insert the rubber stopper with the glass rod into the top cap of the plastic tube. When you proceed with the experiment as in the Jacob's Ladder Demonstration, you will

notice that the plastic tube is filling with a reddish-brown gas. Using any comfortable arrangement, such as a beaker and stand, aspirate the gas from the escape tube into water. Nitrous acid will be formed.

THE HOLE IN THE BOTTOM OF THE PLASTIC PLATFORM IS STILL THERE

4. Theory

Hi, Mike—DO YOU HAVE ANY PET LIGHTNING THEORIES OR DO YOU WANT TO SKIP THIS SECTION?

The formation of nitrous acid occurs as a direct result of storm activity. The nitrous oxide produced by lightning is converted by the rain into nitrous acid. This acid in turn is used by bacteria in the earth soil to produce the nitrates that plants need to grow.

5. Maintenance

The Climbing Arc requires no special maintenance. You may protect the plastic cylinder from scratches during storage by wrapping it in tissue paper. If you should experience any difficulty with a Climbing Arc, please contact Central Scientific Company, giving details of the problem. To ensure better service, please do not return any merchandise to Central Scientific Company without authorization.