Jacob's ladder electricity video

Demonstration: An electric spark jumps between two parallel wires. The spark then climbs the ladder. Fast physics: The transformer at the bottom creates a potential difference between the wires. The electrons bounce off each other, so they jump out of one wire to try to separate as much as possible. The spark heats the surrounding air and raises hot air with it, so the spark rises with it. When the spark comes to the top of the wires, it dies, and the new one starts at the bottom. Details: Jacob's ladder is a relatively simple device. The big box at the bottom is called a transformer. A transformer is something that changes the voltage that goes into the device. You probably have more transformers at home; for example, the charger on your mobile phone is a transformer. Your cell phone converts 120 volts that come from the wall into 9 or 12 Volts. Jacob's ladder converts the same 120 volts into over 500 Volts! When Jacob's ladder is on, the electrons feed into one of the wires. These electrons want to get away from each other, so they jump over another wire connected to the earth. When they jump, we see a bright spark in the air. The spark then climbs the ladder as the air around it heats up. Remember that the hot air rises, and in this case takes a spark with it. This spark is very hot, so hot that it can be classified as plasma (see Plasma Tube). Over time, the spark splits and releases all these electrons into the air. Jacobs' 2003 jacob's ladder is an arch that forms between two upright electrodes that are wider at the top. The arc begins at the bottom and rises with the heat of the arc, which becomes progressively larger until it breaks at the top. Then it starts again at the bottom. (click to increase) On the left of the photo above is jacob's ladder, powered by my original old untied NST and shielded with an acrylic tube to allow for a safe public display. This was a blow to my TC caused by a restrictive arc in the power switch and fuse and also the destruction of the restrictive resistors for the neon's indicator. I need a bigger one. The middle photo shows a 1.6-second exposure that shows the arc rising in steps. Occasionally there is an orange in the spark due to sodium (from salt in sweaty hands to electrodes). The right photo shows the 0.016-second exposure (1/60 sk). Jacobs ladder from microwave 2008 (click to increase) Above shows jacobs ladder running off microwave power supply. It has a voltage multiplier that allows an initial voltage of 10 kV and runs through 10 K ohm 100 W ballast resistance with mo set for cooking for 10 seconds. The shot also captures poor contact, which is internally switches and incineration a plastic wire coating inside the cooking room. Jacobs ladder with water electrode 2005 (click to increase) shows one side ladder using water from our saltwater pool. Simple gravitational feed that siphons from plastic tubes into a metal nozzle with 6kV NST. (video 390 k - run mouse over) The video above shows this in the action. (click to increase) The left photo above shows jacob's double-water current ladder using seawater powered by 12 kV NST . Exposure is 1/8 seconds. See how the sparks are orange with salt on alternate half cycles. It's just one polarity of electrodes that gives color. In the middle of the photo, a 0.4-second exposure is shown, indicating that the arch rises in increds and plastic. The real photo shows 1 second of exposure, so the spark is only 1/8 as bright as in the first photo. (click to increase) The left photo above shows jacob's ladder with double currents of water using seawater. Sometimes, if the spark on the saltwater pool is much more powerful the flame color. The center photo shows the seafle water spark in the left stream and the copper sulphate solution on the right. Consider the loss of sodium yellow. The right photo shows the intense color of sodium in the ladder. The circular Jacobs ladder (and concentric circles) 2007 The usual Jacobs ladder has a spark that moves upwards as the air rises. However, we can also move the spark with the action of the magnetic field. (click to increase) The photo above shows the spark of the NIB magnet (which is a little underwater). The arch will race in circles and be blurred into a conical flame. The reason is the magnetic field, which results in a force to flow just like the right (or is it the left?) manual rule that is the basis for electric motors. (click to increase) The upper left photo shows a circular copper ring near the inside of a 15 cm diameter toroidal ferris magnet. It happens to be conductive (many fertes are not). S indicates that the south end is upper. The center photo shows a gap filled with rotating sparks that makes more rotation per second if the power is high enough. The right photo shows up close at lower power. Now consider the ring on the outside of the magnet to create the same on the outside. This is a bit more difficult probably because of the direction of the fields. However, by designing them with a few external magnets (circular ferita magnets from microwave oven magnetrons) it is possible to get a reasonably circular spark. That's what's trying to reduce the free running of the central hole. (click to increase) The upper left photo shows double copper rings, a large central ferris and eight smaller feries. In the middle is a double concentric circular Jacobs ladder. The detail is displayed in the right photo. (click to increase) The left photo above shows the effect of one electrode in the center. With enough voltage to jump 3.5 cm plus enough current to form a continuous arc, it will rotate around The right photo shows exposure that lasts a few rotations. These yellowish arches are much longer than the lower filled violets above. Of course, if you have 3 kv at 500 A (1.5 MW), then Lorenzo's forces are greater than gravity and heating. Look at this frightening circle of the Jacobs ladder. The 500 kV hot disconnect gives a massive 40-night rising spark. There's no doubt that a good amount of line inductee helps. Jacobs Bi-ladder 2007 This is a two-way Jacob's ladder and has sections that go both up and down. But how is that easy? (click to increase) In the photo above is Jacob's bi-ladder. The long central rod can rotate to widen the gap. He ran from my 80 kV DC stock. So how do you do that? The normal upper segment operates according to the usual air-to-air sequeration mechanism. The lower segment is magnetically ed and has a northern pole of three 1 inch NIB magnets just behind the red acrylic (click to increase) The photo above hides nib magnets behind the red acrylic. The left electrode is positive, and the north is the closest. However, in some minds, I realize that there is another way to achieve an identical photo without magnets. This installation is required in a box with a vote-turned camera with them upside down. If the ladder is re-static, so that the sparks between the central electrode and the upper output electrode, then the long exposure with one rotation through 180 degrees (switching to the upper electrode when rotating) will give a good result. 100kV DC (dental x-ray unit) 2004 This is from a small X-ray transformer. It gave me a friend who got it for AUD $1 on eBay (Thanks, Ralph). It's from an old dental X-ray machine and is estimated to be 60 kV. It looks tiny that a meme transformer would put this under the oil. He doesn't have any shingles, and he can draw 15 A from 240 V. I connected it and, with about half the power (125 V), it is filled with about 30 kV at 20 mA before the inner shortening occurs and the oil starts to bubble. Occasionally, it will run up to 2 1/2 inch spark to the full 240 V. It has a lot more power than NST. (video 570 k - run mouse over) Top left is a 60 kV transformer with a little circuit suppression (ex microwave). The video shows a transformer under oil in a PVC pipe running as Jacob's ladder with a drink can also make for a scale. Jacobs' ladder is the spark of a gap in which the spark between the lowest and closest points is initially formed, and then rises as the air in the plasma sits. Eventually it shuts down near the top, then restarts at the bottom. It's a favorite round-up for old Frankenstein movies. To obtain about 100 kV DC from this 60 kV X-ray transformer I input 150 V AC, which gives 36 kV AC out. With the diode and 0.015 uF 80 kV mica capacitor connected as a voltage double, about 100 kV DC is achieved to be the best spark 5 (13 cm). Note that the spark is foggy (and fairly quiet) due to the current restraint with the rezistor and inducer to reduce the condensor seed. The whole setting is cracked with the corona when it's in action. (click to increase) The aforementioned spark is drawn by a rebel (bottom right and short central poly tube in the left photo), which has 67 x 1.8 k ohm resistance and is almost exactly 100 k ohm. The voltage assessment is unknown, but for these 2 or 3 watt types it is probably about 1 kV each. It was in a PVC pipe and filled with paraffin wax. I've had this in the trash box for 20 years, so I hope they don't miss the date of use. (click to increase) The capacitor (upright tube in the photo) is 2,2 nF rolled polyethylene in an oil cap consisting of 2 sections with 8 layers of sheet on each side. I have a 1 3/4 inch (4 cm) security gap that only starts shooting at output sparks with a double voltage of 4 inches (10 cm). This has been replaced with mica hats for the highest voltages. (click to increase) The diode consists of 290 x 1N4007's in PVC tubes, about 15 inches (40 cm) long. Each is estimated at 1000 PIV per 1 A. This was designed to accommodate the entire 60 kV AC = 169 kV top to top. Allowing 10% increased voltage from variaka gives a total of 186 kV, allowing only 50% head. No resistance to the descent was used. So far, there have been no problems (but many minors have come to grief). Now I have two of these that allow for another level of my voltage multiplier. I also have an inductor made of 21 g of wire near the wound 15 inches to 1 inch (2.5cm) former. The inductor and the rebel are required to limit the current for devices such as the lift (below). (below).