

tube, and in commencing operation by this method have the spark-gap two inches between the sliding terminals, and gradually pull them apart beyond sparking space while the machine is in motion. It is customary to place large Leyden jars beneath the pole pieces of the static machine in the hope that better results may be obtained, the jars acting as condensers and having a tendency to reinforce the current ; but I have not noticed any material difference in such arrangements. (2) The Leyden jar oscillating current is attached by connecting the tube terminals with Leyden jars having not more than twelve square inches to the external or internal armatures ; otherwise, if larger jars are used, the condensation is so great and the consequent current reinforced to such an extent that injury may be done to the tubes. In commencing operation by this method, have the sliding poles close together, and gradually pull them apart beyond sparking capacity as the machine is being worked. In having the Leyden jars in a circuit, remember that by induction the current is changed—namely, the prime conductor giving positive electricity and entering the internal armature, as such is negative when it leaves the external armature ; therefore, for example, an anodal prime conductor of the static machine is attached to the cathodal end of the Crookes' tube, providing the Leyden jar is in the circuit between the static machine and the tube. (3) The interrupter spark-gap is connected in the following manner : having first noted the anodal and cathodal terminals and having placed the interrupters on the handles of the sliding rods, which have been pulled wide apart, connect the anodal interrupter to the anodal terminal of the tube and the cathodal interrupter to the cathodal terminal of the tube. In commencing operation with a machine connected in this manner, have the interruptions about one-eighth of an inch in space, and gradually increase this space to about one inch at the positive and to one-half inch at the negative pole. Of course, this space of spark-gap will depend greatly upon the size and density of the tube. The Leyden jars may be in their proper position with the external rod extending high enough to be in contact with the post of the sliding terminal. In this position the jars are supposed to act as condensers and so increase the electromotor force of the current. This method of connecting I claim to be superior to the other two, for the following reasons :—(1) There is not as much waste of current, and consequently a greater amount passes through the tube ; (2) the interrupters give greater bombardment to the ray within the tube, and thereby greater penetration is produced.

The induction coil is the most convenient, especially if