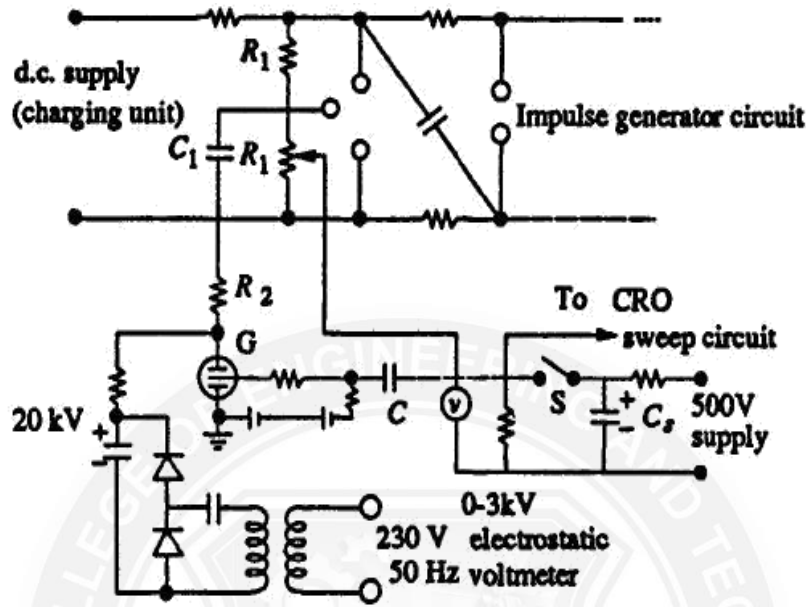


TRIPPING AND CONTROL OF IMPULSE GENERATORS

In large impulse generators, the spark gaps are generally sphere gaps or gaps formed by hemispherical electrodes. The gaps are arranged such that sparking of one gap results in automatic sparking of other gaps as overvoltage is impressed on the other. In order to have consistency in sparking, irradiation from an ultra-violet lamp is provided from the bottom to all the gaps. To trip the generator at a predetermined time, the spark gaps may be mounted on a movable frame, and the gap distance is reduced by moving the movable electrodes closer.

This method is difficult and does not assure consistent and controlled tripping. A simple method of controlled tripping consists of making the first gap a three electrode gap and firing it from a controlled source. Figure gives the schematic arrangement of a three electrode gap. The first stage of the impulse generator is fitted with a three electrode gap, and the central electrode is maintained at a potential in-between that of the top and the bottom electrodes with the resistors R_1 and R_2 . The tripping is initiated by applying a pulse to the thyatron G by closing the switch S. The capacitor C produces an exponentially decaying pulse of positive polarity the pulse goes and initiates the oscillograph time base. The thyatron conducts on receiving the pulse from the switch S and produces a negative pulse through the capacitance C_1 at the central electrode of the three electrode gap. Hence, the voltage between the central electrode and the top electrode of the three electrode gap goes above its sparking potential and thus the gap conducts. The time lag required for the thyatron firing and breakdown of the three electrode gap ensures that the sweep circuit of the oscillograph begins before the start of the impulse generator voltage.

Figure 3.6.1 Tripping of an impulse generator with a three electrode gap



[Source: "High Voltage Engineering" by C.L. Wadhwa , Page – 467]

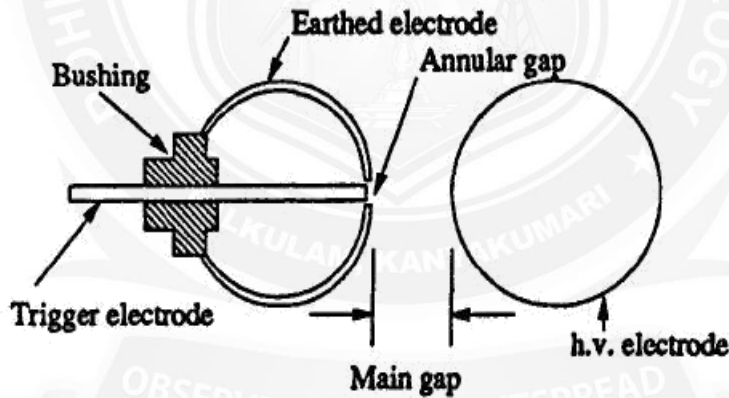


Figure 3.6.2 Trigatron gap

[Source: "High Voltage Engineering" by C.L. Wadhwa , Page – 476]

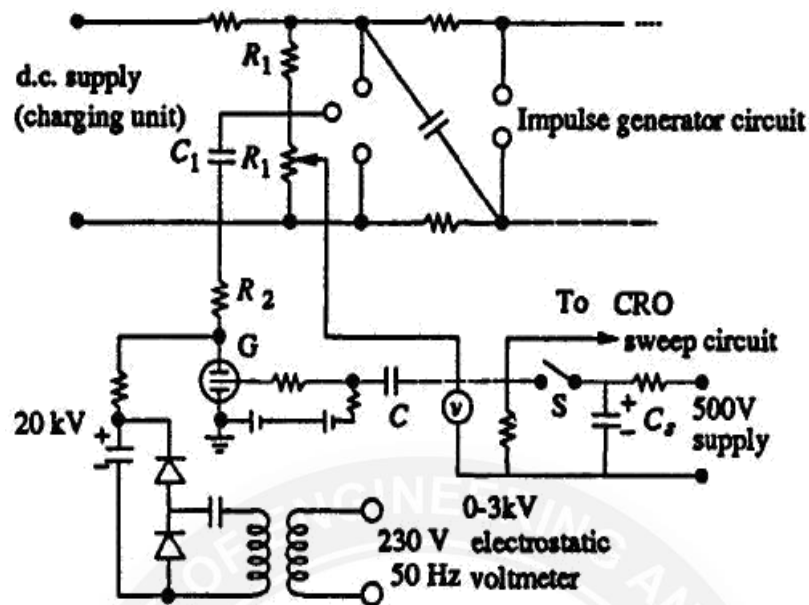


Figure 3.6.3 Trigatron gap and tripping circuit

[Source: "High Voltage Engineering" by C.L. Wadhwa , Page – 495]

A trigatron gap consists of high voltage spherical electrode of suitable size, an earthed main electrode of spherical shape, and a trigger electrode through the main electrode. The trigger electrode is a metal rod with an annular clearance of about 1 mm fitted into the main electrode through a bushing. The trigatron is connected to a pulse circuit as shown in fig. 3.26 b. Tripping of the impulse generator is effected by a trip pulse which produces a spark between the trigger electrode and the earthed sphere. Due to space charge effects and distortion of the field in the main gap, spark over of the main gap Fig. 3.27 applied for correct operation.