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(54) **Method for spot-knocking an electron gun assembly of a cathode ray tube**

Verfahren zum Ausbrennen von Fehlerstellen bei einer Elektronenkanonenstruktur einer Kathodenstrahlröhre

Procédé d'élimination de défauts dans une structure de canon à électrons d'un tube à rayons cathodiques

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Description

The present invention relates to a method for spot-knocking an electron gun assembly of a cathode ray tube (CRT), which is performed after the CRT is assembled.

In general, a CRT has an envelope composed of a panel having a phosphor screen on its inner surface, and a funnel formed continuous with the panel. An electron gun including a plurality of electrodes such a focus electrode and a final acceleration electrode is provided within a neck of the funnel.

FIG. 1 shows an example of the structure of such an electron gun. The electron gun comprises a heater 11, a cathode 12 heated by the heater 11, a first grid electrode 13, a second grid electrode 14, a third grid electrode 15, a fourth grid electrode 16, a fifth grid electrode 17, a sixth grid electrode 18 and a convergence electrode 19. The second grid electrode 14 and fourth grid electrode 16 are connected within a neck 1, and similarly the third grid electrode 15 and fifth grid electrode 17 are connected within the neck 1. The heater 11 is supplied with a heater voltage. The first grid electrode 13 is grounded. The second grid electrode 14 and fourth grid electrode 16 are supplied with a relatively low voltage of about several hundred V. The sixth grid electrode 18 is supplied with a relatively high voltage of 20 to 30 kV via a high voltage input terminal or anode button 20 provided on the funnel 2, an internal conductor film 3 provided on the inner surface of the funnel 2, a bulb spacer 4, and the convergence electrode 19. An intermediate voltage of about 28% of the voltage applied to the sixth grid voltage 18 is applied across the third grid electrode 15 and fifth grid electrode 17. Accordingly, in this electron gun, the first grid electrode 13, second grid electrode 14 and fourth grid electrode 16 constitute low voltage-side electrodes, the third grid electrode 15 and fifth grid electrode 17 constitute intermediate voltage-side electrodes, and the sixth grid electrode 18 constitutes a high voltage-side electrode as a final acceleration electrode.

Conventionally, the CRT is subjected to a spot-knocking process to improve a withstanding voltage of an electron gun assembly, after it has been assembled. In the spot-knocking process or treatment, an electric discharge is caused among a plurality of electrodes of the electron gun and the surfaces of the electrodes are treated. In the spot-knocking process, in general, a sufficient spot-knocking treatment can be performed on the fifth grid electrode 17 of these electrodes, since it is situated adjacent to the sixth grid electrode 18 to which a high voltage is applied from the high voltage input terminal 20. However, the spot-knocking treatment of the electron gun must be performed not only on the fifth grid electrode 17 but also on the second grid electrode 14 and fourth grid electrode 16 situated closer to the cathode 12 than the fifth grid electrode 17. For this purpose, a high voltage must be applied to the third grid electrode 15.

In order to perform such spot-knocking treatment of the CRT, there have been proposed several methods.

Jap. Pat. Appln. KOKOKU Publication No. 61-38571 discloses an intermediate electrode floating method as a first method, as is shown in FIG. 2. A CRT 10 has an electron gun. The electron gun comprises a heater 11, a cathode 12, a first grid electrode 13, a second grid electrode 14, a third grid electrode 15, a fourth grid electrode 16, a fifth grid electrode 17 and a sixth grid electrode 18. An acceleration high voltage is applied to the sixth grid electrode 18 from a high voltage input terminal 20. A high voltage is applied to the high voltage input terminal 20 from a power supply 21. For example, the third grid electrode 15 and fifth grid electrode 17 are electrically separated as intermediate electrodes from the other electrodes in a floating state. Thus, a high voltage is applied to these intermediate electrodes. Reference numerals 22 and 23 denote ballast resistors inserted in a power supply circuit, and numeral 30 denotes a socket connected to the heater 11, cathode 12, first grid electrode 13, second grid electrode 14 and fourth grid electrode 16. However, in this method, a potential difference between the intermediate electrodes, on the one hand, and the low voltage-side electrodes, on the other hand, is not constant, and an applied voltage runs short.

A second method or a method of directly applying a high voltage to intermediate electrodes is illustrated in FIG. 3. In the embodiment shown in FIG. 3, a high voltage is applied from a power supply 24 to the third grid electrode 15 and fifth grid electrode 17. Spot-knocking treatment should normally be performed so as not to cause a creeping discharge to the socket 30. Thus, the smaller the pulse width of an applied voltage, the better. The reason for this is that a little time is needed from when a high voltage exceeding a level at which a creeping discharge occurs in the socket ("critical voltage" level) is applied to when a creeping discharge current begins to flow. However, in the second method, a voltage applied from the power supply 24 has a large pulse width, as shown by a solid line 41 in FIG. 5. Thus, the applied voltage is limited by the critical voltage, and a sufficiently high voltage cannot be applied.

FIG. 4 illustrates a third method. A high voltage resistor 28 is provided between the intermediate voltage-side electrodes, i.e. the third grid electrode 15 and fifth grid electrode 17, on the one hand, and the low voltage-side electrodes, on the other hand. By making use of a voltage drop occurring when a discharge current caused between the fifth grid electrode 17 and sixth grid electrode 18 flows through a high voltage resistor 28, a high voltage is applied to the intermediate electrodes. Reference numeral 25 denotes a power supply producing a high voltage, and numerals 26 and 27 denote ballast resistors inserted in a power supply circuit. In this method, as compared to the second method of directly applying the high voltage to the intermediate electrodes, the volt-

age applied to the low voltage-side electrodes from the intermediate electrodes (intermediate voltage-side electrodes) has a steep pulse waveform as shown by a broken line in FIG. 5. Accordingly, even if a high voltage exceeding a critical voltage level at which a creeping discharge occurs in the socket 30 is applied, no creeping discharge occurs. Thus, an effective spot-knocking treatment process with an increased applied voltage can be performed. However, in this method, application of a high voltage to the low voltage side is limited by a discharge between the high voltage-side fifth grid electrode 17 and sixth grid electrode 18. As a result, the number of applications of pulses becomes insufficient.

As has been described above, there are various conventional methods of spot-knocking treatment for CRTs. In particular, a high voltage can be applied to the intermediate voltage-side electrodes according to the third method wherein the high voltage resistor is inserted between the intermediate voltage-side electrodes and the low voltage-side electrodes, and the voltage drop, occurring when the discharge current produced between the high voltage-side electrode to which the acceleration high voltage is applied and the intermediate voltage-side electrodes provided adjacent thereto flows through the high voltage resistor, is utilized, thereby applying the high voltage to the intermediate voltage-side electrodes. However, if the high voltage-side discharge is completed, the high voltage cannot be applied to the low voltage side, and the number of pulse applications may run short.

The object of the present invention is to provide a method for spot-knocking an electron gun assembly of a cathode ray tube, capable of sufficiently performing low voltage-side spot-knocking treatment by applying a high voltage pulse to an intermediate voltage electrode even after a high voltage-side discharge is completed.

The methods of the present invention are defined in claims 1 and 4.

In order to achieve the object, according to this invention, there is provided a method of spot-knocking an electron gun assembly of a cathode ray tube, wherein a discharge is caused among electrodes of an electron gun provided within a neck of an envelope and having at least a low voltage electrode, an intermediate voltage electrode and a high voltage electrode, thereby performing spot-knocking treatment, and a discharge gap for applying a high voltage pulse to the intermediate voltage electrode is provided on the outside of the cathode ray tube, and a high voltage is applied to the intermediate electrode by utilizing a discharge occurring in the discharge gap.

In a preferred embodiment of this method of spot-knocking treatment for a cathode ray tube, a high voltage resistor, through which a discharge current of a discharge occurring in the discharge gap flows, is provided between the intermediate voltage electrode and the low voltage electrode.

In another embodiment, a first discharge gap for applying a high voltage pulse to the intermediate voltage electrode is provided, and a second discharge gap is provided between the intermediate voltage electrode and the low voltage electrode.

A high voltage of 60 kV or more may be applied to the high voltage input terminal.

A discharge start voltage of the discharge gap may be set at 30 to 60 kV.

Thereby, a high voltage pulse is applied to the intermediate voltage electrode to cause a discharge on the low voltage side, and sufficient spot-knocking treatment can be performed on the low voltage side as well as the high voltage side.

This invention can be more fully understood from the following detailed description when taken in conjunction with the accompanying drawings, in which:

FIG. 1 is a cross-sectional view showing schematically the structure of an electron gun of a general cathode ray tube (CRT);
FIG. 2 shows a circuit wherein a conventional spot-knocking treatment method is applied to the electron gun of the CRT as shown in FIG. 1;
FIG. 3 shows a circuit wherein another conventional spot-knocking treatment method is applied to the electron gun of the CRT as shown in FIG. 1;
FIG. 4 shows a circuit wherein still another conventional spot-knocking treatment method is applied to the electron gun of the CRT as shown in FIG. 1;
FIG. 5 is a graph showing schematically waveforms of applied voltages in the spot-knocking treatment according to the circuits shown in FIGS. 3 and 4;
FIG. 6 is a schematic circuit diagram for describing a spot-knocking treatment method according to an embodiment of the present invention; and
FIG. 7 is a schematic circuit diagram for describing a spot-knocking treatment method according to another embodiment of the invention.

Embodiments of a spot-knocking treatment method for a cathode ray tube (CRT) according the present invention will now be described with reference to the accompanying drawings.

FIG. 6 is a circuit diagram for describing a spot-knocking treatment method according to an embodiment of the present invention. The structure of the CRT itself is identical to that of the CRT shown in FIG. 1. Thus, common structural elements are denoted by like reference numerals, and a description thereof omitted.

An electron gun of a cathode ray tube (CRT) 10 shown in FIG. 6 comprises a heater 11, a cathode 12, a first grid electrode 13, a second grid electrode 14, a third grid electrode 15, a fourth grid electrode 16, a fifth grid electrode 17, and a sixth grid electrode 18. The second grid electrode 14 and fourth grid electrode 16 are connected within the neck, and similarly the third grid electrode 15 and fifth grid electrode 17 are connected within the neck. While the CRT 10 is operated, the heater 11

is supplied with a heater voltage. The first grid electrode 13 is grounded. The second grid electrode 14 and fourth grid electrode 16 are supplied with a low voltage. The sixth grid electrode 18 is supplied with an accelerated high voltage via a high voltage input terminal 20 provided on the funnel, the internal conductor film provided on the inner surface of the funnel, etc. Accordingly, in this electron gun, the first grid electrode 13, second grid electrode 14 and fourth grid electrode 16 constitute low voltage-side electrodes, the third grid electrode 15 and fifth grid electrode 17 constitute intermediate voltage-side electrodes, and the sixth grid electrode 18 constitutes a high voltage-side electrode as a final acceleration electrode.

According to an embodiment of the spot-knocking treatment method for the CRT of this invention, an output terminal of a power supply 51 is connected to the high voltage input terminal 20 via a ballast resistor 52, and the other terminal of the power supply 51 is connected via a socket 30 to the heater 11, cathode 12, first grid electrode 13, second grid electrode 14 and fourth grid electrode 16. On the outside of the CRT 10, a discharge gap 50 is provided between the high voltage input terminal 20 and a node between the intermediate voltage-side electrodes, i.e. the third grid electrode 15 and fifth grid electrode 17. The length of the discharge gap 50 is set so that a discharge begins at a discharge start voltage of about 30 to 60 kV. In addition, on the outside of the CRT 10, a high voltage resistor 54 is inserted between the intermediate voltage-side electrodes, i.e. the third grid electrode 15 and fifth grid electrode 17, on the one hand, and the low voltage-side electrodes, i.e. the first grid electrode 13, second grid electrode 14 and fourth grid electrode 16, on the other hand.

With the above circuit configuration, when the output voltage from the power supply 51 is set at 60 to 80 kV, a discharge occurs between the high voltage-side electrodes and spot-knocking treatment is effected between the sixth grid electrode 18 and the adjacent fifth grid electrode 17. At this time, a high voltage pulse is applied across the third grid electrode 15 and fifth grid electrode 17 due to a voltage drop occurring when the discharge current flows through the high voltage resistor 54. By this high voltage pulse, a discharge occurs between the intermediate voltage-side electrodes and the low voltage-side electrodes and spot-knocking treatment is effected among these electrodes. In other words, the low voltage-side spot-knocking treatment is effected by making use of the discharge current occurring due to the discharge across the high voltage-side electrodes.

However, when the discharge across the high voltage-side electrodes stops, the high voltage is no longer applied to the intermediate voltage-side electrodes and consequently the low voltage-side spot-knocking treatment using the discharge current occurring due to the discharge between the high voltage-side electrodes is stopped. When the discharge between the high voltage-side electrodes stops, however, the discharge gap 50, in turn, causes a discharge. The resultant discharge current flows to the high voltage resistor 54, and a high voltage pulse is applied to the intermediate voltage-side electrodes. By making use of the discharge current produced from the discharge gap 50, the high voltage pulse is continuously applied to the intermediate voltage-side electrodes. Thus, even after the spot-knocking treatment for the high voltage-side electrodes is finished, the spot-knocking treatment for the low voltage-side electrodes can be performed.

In this spot-knocking treatment method, the voltage applied from the power supply 51 has a steep pulse waveform as shown by the broken line 42 in FIG. 5. Thus, even if a high voltage exceeding the critical voltage level at which a creeping discharge occurs in the socket 30 is applied, the voltage applied when the discharge current begins to flow is lower than the critical voltage and no creeping discharge occurs. Accordingly, effective spot-knocking treatment can be performed by increasing the applied voltage. In addition, even when the discharge stops between the high voltage-side electrodes, a sufficient number of pulses can be applied to the low voltage-side electrodes to effect the spot-knocking treatment. Therefore, the spot-knocking treatment can be fully performed.

A spot-knocking treatment method for a CRT according to another embodiment of the invention will now be described.

In the preceding embodiment, the voltage drop occurring when the discharge current produced from the discharge gap provided outside the CRT flows through the high voltage resistor inserted between the intermediate voltage-side electrodes and low voltage-side electrodes is utilized as a high voltage necessary for the low voltage-side spot-knocking treatment after the high voltage-side spot-knocking treatment is finished. In the present embodiment, as is shown in FIG. 7, a first discharge gap 50 is provided outside the CRT between the high voltage input terminal 20 and the intermediate voltage-side electrodes, i.e. the third grid electrode 15 and fifth grid electrode 17. In addition, the high voltage resistor as shown in FIG. 6 is replaced by a second discharge gap 55 provided between the third grid electrode 15 and fifth grid electrode 17, on the one hand, and the first grid electrode 13, second grid electrode 14 and fourth grid electrode 16, on the other hand.

The discharge start voltage of the discharge gap 55 is set at 20 to 30 kV. Thereby, like the preceding embodiment, a voltage with a small pulse width is applied to the low voltage-side electrodes. Even after the high voltage-side spot-knocking treatment is finished, the low voltage-side spot-knocking treatment can be performed. If the discharge gap 55 is provided, the voltage applied to the intermediate voltage-side electrodes can be controlled.

The CRT was treated by the above spot-knocking treatment methods. In the conventional spot-knocking

treatment method, the percentage of deficiency of spot-knocking treatment was about 10%. By contrast, according to the methods of the present invention, this percentage was reduced to about 2%, and it was confirmed that the spot-knocking treatment was performed efficiently and exactly.

Needless to say, the discharge start voltage of the discharge gap in the spot-knocking treatment of the present invention is not limited to the levels shown in the above embodiments.

As has been described above, according to the spot-knocking treatment method of this invention, not only the high voltage-side spot-knocking treatment but also the low voltage-side spot-knocking treatment can be fully performed. The deficiency of spot-knocking treatment, which occurs in the conventional spot-knocking treatment methods, can be overcome, and cathode ray tubes with good voltage-withstanding characteristics can be obtained.

Claims

1. A method for spot-knocking an electron gun assembly of a cathode ray tube (10) including an envelope having a neck, and an electron gun having a low voltage electrode (14, 16) kept at a low voltage when the cathode ray tube (10) is driven, a high voltage electrode (18) kept at a high voltage when the cathode ray tube is driven, and an intermediate electrode (15, 17) kept at an intermediate voltage between the low voltage and the high voltage when the cathode ray tube (10) is driven, said method characterized by comprising the steps of:

   connecting the high voltage electrode (18) and the intermediate voltage electrode (15, 17) via a discharge gap (50) and electrically connecting the intermediate electrode (15, 17) and the low voltage electrode (14, 16) on the outside of the cathode ray tube (10);
   applying a high voltage pulse across the high voltage electrode (18) and the low voltage electrode (14, 16), thereby causing a discharge between the high voltage electrode (18) and the low voltage electrode (14, 16), and then causing a discharge in the discharge gap (50); and applying the high voltage pulse across the intermediate electrode (15, 17) and the low voltage electrode (14, 16) by utilizing the discharge occurring in the discharge gap (50), thereby causing a discharge between the intermediate voltage electrode (15, 17) and the low voltage electrode (14, 16).

2. The method according to claim 1, characterized in that a high voltage resistor (28) through which a discharge current of the discharge occurring in the discharge gap flows is provided between the intermediate electrode (15, 17) and the low voltage electrode (14, 16).

3. The method according to claim 1, characterized in that a discharge start voltage of the discharge gap (50) is set in a range of 30 to 60 kV.

4. A method of spot-knocking treatment for a cathode ray tube (10) including an envelope having a neck, and an electron gun having a low voltage electrode (14, 16) kept at a low voltage when the cathode ray tube is driven, a high voltage electrode (18) kept at a high voltage when the cathode ray tube (10) is driven, and an intermediate electrode kept (15, 17) at an intermediate voltage between the low voltage and the high voltage when the cathode ray tube (10) is driven, said method characterized by comprising the steps of:

   connecting the high voltage electrode (18) and the intermediate voltage electrode (15, 17) via a first discharge gap (50) and connecting the intermediate electrode (15, 17) and the low voltage electrode (14, 16) via a second discharge gap (55) on the outside of the cathode ray tube;
   applying a high voltage pulse across the high voltage electrode (18) and the low voltage electrode (14, 16), thereby causing a discharge between the high voltage electrode (18) and the low voltage electrode (14, 16), and then causing a discharge in the first and second discharge gaps (50, 55); and
   applying the high voltage pulse across the intermediate electrode (15, 17) and the low voltage electrode (14, 16) by utilizing the discharge occurring in the discharge gaps (50, 55), thereby causing a discharge between the intermediate voltage electrode (15, 17) and the low voltage electrode (14, 16).

5. The method according to claim 1 or 4, characterized in that the cathode ray tube includes a high voltage input terminal connected to the high voltage electrode (18), and a high voltage pulse is applied across the high voltage electrode and the low voltage electrode (14, 16) via the high voltage input terminal.

6. The method according to claim 1 or 4, characterized in that a high voltage of 60 kV or more is applied across the high voltage electrode (18) and the low voltage electrode (14, 16).

7. The method according to claim 4, characterized in that a discharge start voltage of the first discharge gap (50) is set in a range of 30 to 60 kV.

Patentansprüche

1. Verfahren zum Fehler-Ausbrennen einer Elektronenkanonenanordnung einer Kathodenstrahlröhre (10) umfassend einen Kolben mit einem Hals und eine Elektronenkanone mit einer Niederspannungselektrode (14, 16), die auf einer niedrigen Spannung gehalten ist, wenn die Kathodenstrahlröhre (10) angesteuert wird, einer Hochspannungselektrode (18), die auf einer hohen Spannung gehalten ist, wenn die Kathodenstrahlröhre angesteuert wird, und einer Zwischenelektrode (15, 17), die auf einer Zwischenspannung zwischen der niedrigen Spannung und der hohen Spannung gehalten ist, wenn die Kathodenstrahlröhre (10) angesteuert wird, wobei das Verfahren durch die folgenden Schritte gekennzeichnet ist:

   Verbinden der Hochspannungselektrode (18) und der Zwischenspannungselektrode (15, 17) über einen Entladungsspalt (50) und elektrisches Verbinden der Zwischenelektrode (15, 17) und der Niederspannungselektrode (14, 16) auf der Außenseite der Kathodenstrahlröhre (10),
   Anlegen eines Hochspannungspulses an die Hochspannungselektrode (18) und die Niederspannungselektrode (14, 16), um dadurch eine Entladung zwischen der Hochspannungselektrode (18) und der Niederspannungselektrode (14, 16) zu verursachen und um dann eine Entladung in dem Entladungsspalt (50) zu bewirken, und
   Anlegen des Hochspannungspulses an die Zwischenelektrode (15, 17) und die Niederspannungselektrode (14, 16) unter Verwendung der in dem Entladungsspalt (50) auftretenden Entladung, um dadurch eine Entladung zwischen der Zwischenspannungselektrode (15, 17) und der Niederspannungselektrode (14, 16) zu verursachen.

2. Verfahren nach Anspruch 1, dadurch gekennzeichnet, daß ein Hochspannungswiderstand (28), durch den ein Entladungsstrom der Entladung, die in dem Entladungsspalt auftritt, fließt, zwischen der Zwischenelektrode (15, 17) und der Niederspannungselektrode (14, 16) vorgesehen ist.

3. Verfahren nach Anspruch 1, dadurch gekennzeichnet, daß eine Entladungsstartspannung des Entladungsspalts (50) in einen Bereich von 30 bis 60 kV eingestellt ist.

4. Verfahren einer Fehlerausbrennbehandlung für eine Kathodenstrahlröhre (10), umfassend einen Kolben mit einem Hals und eine Elektronenkanone mit einer Niederspannungselektrode (14, 16), die auf einer niedrigen Spannung gehalten ist, wenn die Kathodenstrahlröhre angesteuert wird, einer Hochspannungselektrode (18), die auf einer hohen Spannung gehalten ist, wenn die Kathodenstrahlröhre (10) angesteuert wird, und einer Zwischenelektrode (15, 17), die auf einer Zwischenspannung zwischen der niedrigen Spannung und der hohen Spannung gehalten ist, wenn die Kathodenstrahlröhre (10) angesteuert wird, wobei das Verfahren durch die folgenden Schritte gekennzeichnet ist:

   Verbinden der Hochspannungselektrode (18) und der Zwischenspannungselektrode (15, 17) über einen ersten Entladungsspalt (50) und Verbinden der Zwischenelektrode (15, 17) und der Niederspannungselektrode (14, 16) über einen zweiten Entladungsspalt (55) auf der Außenseite der Kathodenstrahlröhre,
   Anlegen eines Hochspannungspulses an die Hochspannungselektrode (18) und die Niederspannungselektrode (14, 16), um dadurch eine Entladung zwischen der Hochspannungselektrode (18) und der Niederspannungselektrode (14, 16) zu verursachen, und um dann eine Entladung in dem ersten und dem zweiten Entladungsspalt (50, 55) zu bewirken, und
   Anlegen des Hochspannungspulses über die Zwischenelektrode (15, 17) und die Niederspannungselektrode (14, 16) unter Verwendung der in den Entladungsspalten (50, 55) auftretenden Entladung, um dadurch eine Entladung zwischen der Zwischenspannungselektrode (15, 17) und der Niederspannungselektrode (14, 16) zu verursachen.

5. Verfahren nach Anspruch 1 oder 4, dadurch gekennzeichnet, daß die Kathodenstrahlröhre einen mit der Hochspannungselektrode (18) verbundenen Hochspannungseingangsanschluß umfaßt und ein Hochspannungspuls an die Hochspannungselektrode und die Niederspannungselektrode (14, 16) mittels des Hochspannungseingangsanschlusses angelegt wird.

6. Verfahren nach Anspruch 1 oder 4, dadurch gekennzeichnet, daß eine Hochspannung von 60 kV oder mehr an die Hochspannungselektrode (18) und die Niederspannungselektrode (14, 16) angelegt wird.

7. Verfahren nach Anspruch 4, dadurch gekennzeichnet, daß eine Entladungsstartspannung des ersten Entladungsspaltes (50) in einen Bereich von 30 bis 60 kV eingestellt ist.

Revendications

1. Procédé de projection localisée d'un ensemble à canon à électrons d'un tube à rayons cathodiques (10) comprenant une enveloppe ayant un col, et un canon à électrons ayant une électrode à basse tension (14, 16) maintenue à une basse tension lorsque le tube à rayons cathodiques (10) est piloté, une électrode à haute tension (18) maintenue à une haute tension lorsque le tube à rayons cathodiques est piloté, et une électrode intermédiaire (15, 17) maintenue à une tension intermédiaire comprise entre la basse tension et la haute tension lorsque le tube à rayons cathodiques (10) est piloté, le procédé étant caractérisé en ce qu'il comprend les étapes suivantes :

   la connexion de l'électrode à haute tension (18) et de l'électrode à tension intermédiaire (15, 17) par l'intermédiaire d'un espace de décharge (50) et la connexion électrique de l'électrode intermédiaire (15, 17) et de l'électrode à basse tension (14, 16) à l'extérieur du tube à rayons cathodiques (10),
   l'application d'une impulsion à haute tension entre l'électrode à haute tension (18) et l'électrode à basse tension (14, 16), de manière qu'une décharge soit provoquée entre l'électrode à haute tension (18) et l'électrode à basse tension (14, 16), si bien qu'une décharge est provoquée dans l'espace de décharge (50), et l'application de l'impulsion à haute tension entre l'électrode intermédiaire (15, 17) et l'électrode à basse tension (14, 16) par utilisation de la décharge se produisant dans l'espace de décharge (50), si bien qu'une décharge est provoquée entre l'électrode à tension intermédiaire (15, 17) et l'électrode à basse tension (14, 16).

2. Procédé selon la revendication 1, caractérisé en ce qu'une résistance à haute tension (28) dans laquelle circule un courant de la décharge se produisant dans l'espace de décharge est placée entre l'électrode intermédiaire (15, 17) et l'électrode à basse tension (14, 16).

3. Procédé selon la revendication 1, caractérisé en ce qu'une tension d'amorçage de décharge dans l'espace de décharge (50) est réglée entre 30 et 60 kV.

4. Procédé de traitement par projection localisée d'un tube à rayons cathodiques (10) comprenant une enveloppe ayant un col, et un canon à électrons ayant une électrode à basse tension (14, 16) maintenue à une basse tension lorsque le tube à rayons cathodiques est piloté, et une électrode à haute tension (18) maintenue à une haute tension lorsque le tube à rayons cathodiques (10) est piloté, et une électrode intermédiaire (15, 17) maintenue à une tension intermédiaire comprise entre la basse tension et la haute tension lorsque le tube à rayons cathodiques (10) est piloté, le procédé étant caractérisé en ce qu'il comprend les étapes suivantes :

   la connexion de l'électrode à haute tension (18) et de l'électrode à tension intermédiaire (15, 17) par un premier espace de décharge (50) et la connexion de l'électrode intermédiaire (15, 17) et de l'électrode à basse tension (14, 16) par un second espace de décharge (55) placé à l'extérieur du tube à rayons cathodiques,
   l'application d'une impulsion à haute tension entre l'électrode à haute tension (18) et l'électrode à basse tension (14, 16) afin qu'une décharge soit provoquée entre l'électrode à haute tension (18) et l'électrode à basse tension (14, 16), avec création d'une décharge dans le premier et le second espace de décharge (50, 55), et
   l'application de l'impulsion à haute tension entre l'électrode intermédiaire (15, 17) et l'électrode à basse tension (14, 16) par utilisation de la décharge qui se produit dans les espaces de décharge (50, 55), si bien qu'une décharge est provoquée entre l'électrode à tension intermédiaire (15, 17) et l'électrode à basse tension (14, 16).

5. Procédé selon la revendication 1 ou 4, caractérisé en ce que le tube à rayons cathodiques possède une borne d'entrée de haute tension connectée à l'électrode à haute tension (18), et une impulsion à haute tension est appliquée entre l'électrode à haute tension et l'électrode à basse tension (14, 16) par l'intermédiaire de la borne d'entrée de haute tension.

6. Procédé selon la revendication 1 ou 4, caractérisé en ce que la haute tension de 60 kV ou plus est appliquée entre l'électrode à haute tension (18) et l'électrode à basse tension (14, 16).

7. Procédé selon la revendication 4, caractérisé en ce qu'une tension d'amorçage de décharge du premier espace de décharge (50) est réglée dans la plage comprise entre 30 et 60 kV.

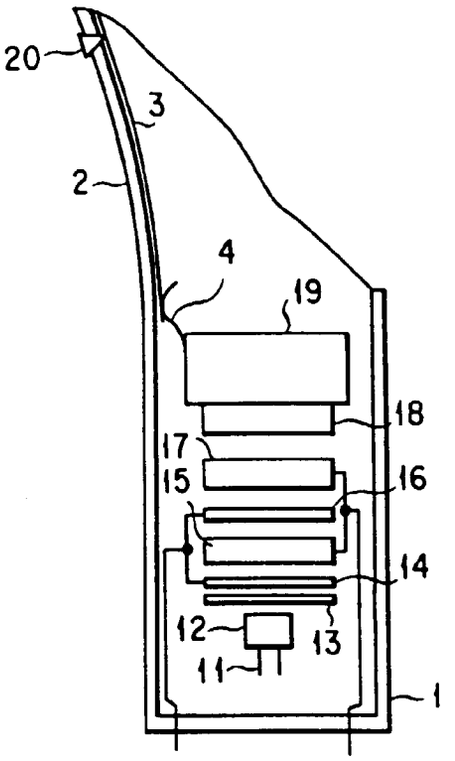
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FIG. 1

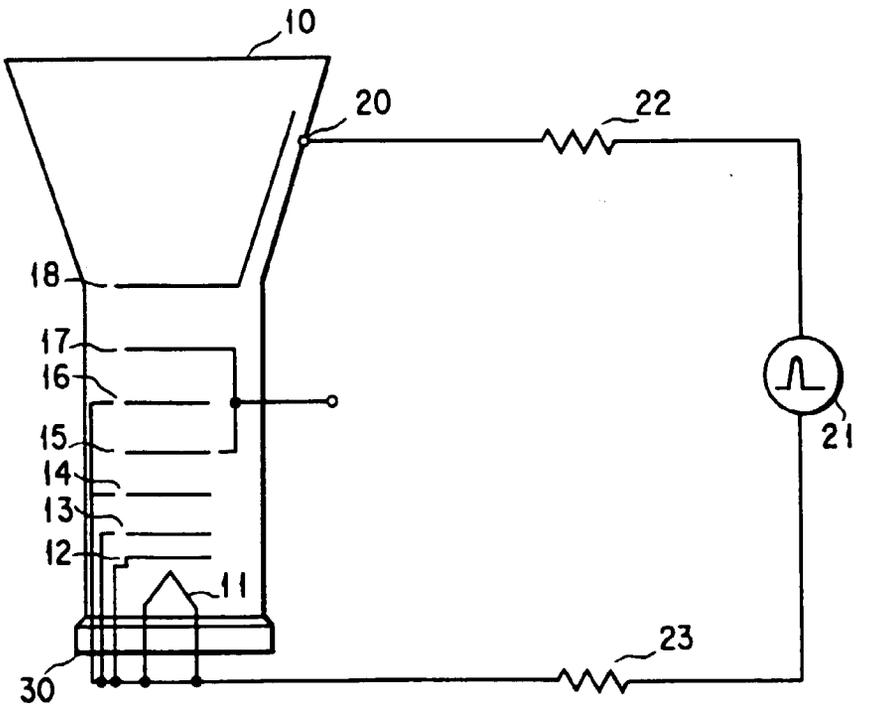
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FIG. 2

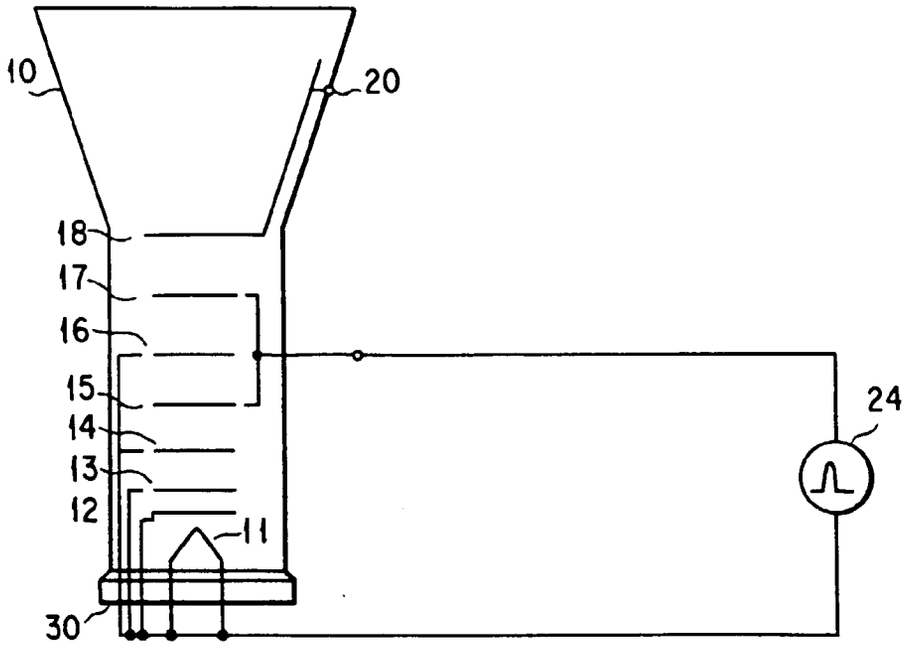
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FIG. 3

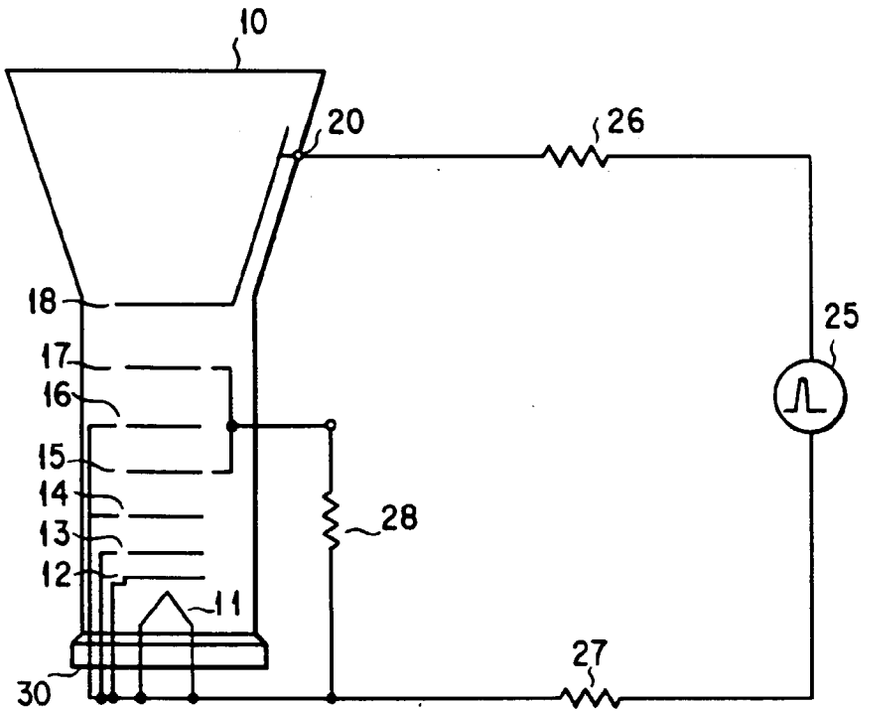
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FIG. 4

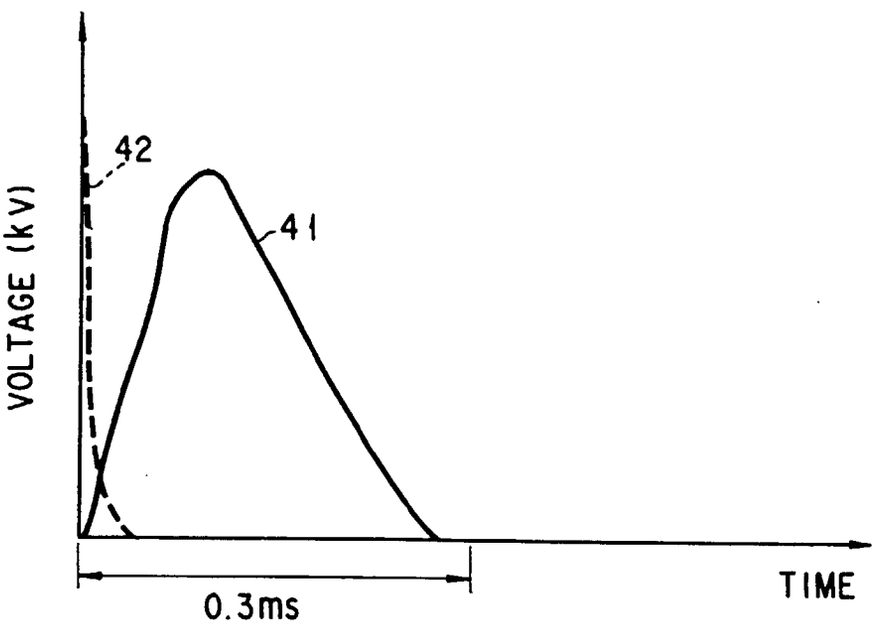

FIG. 5

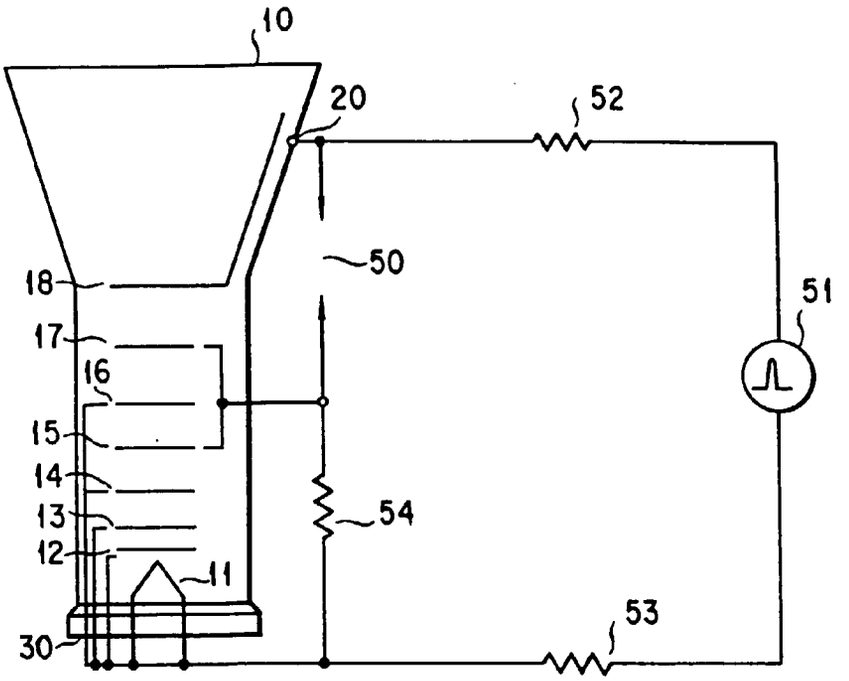
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FIG. 6

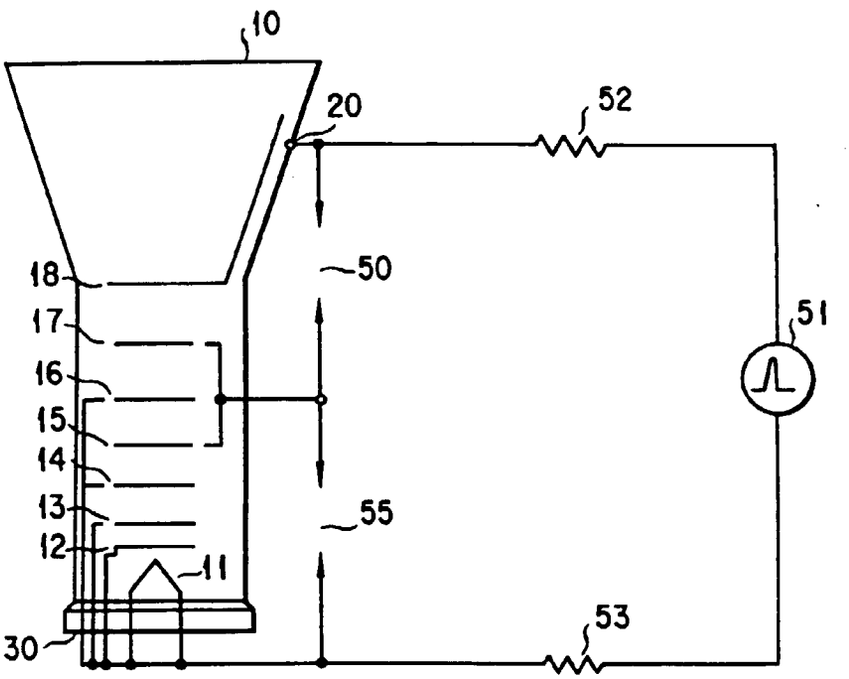
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FIG. 7