Oct. 11, 1960 S. J. GARTNER 2,956,196

STRAP AND PERFORATED INSULATOR ASSEMBLY

Filed April 18, 1955

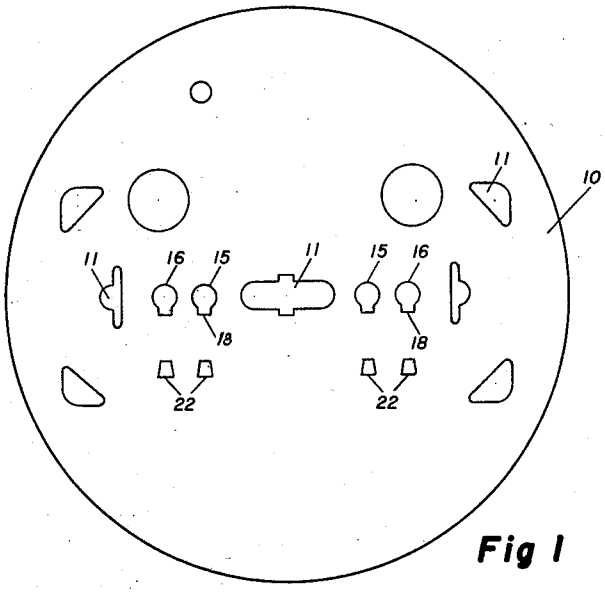


Fig 1

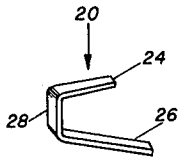


Fig 2

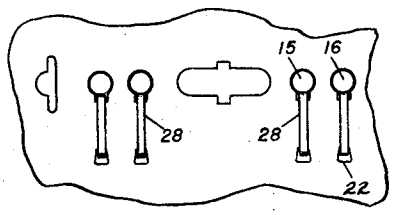


Fig 3

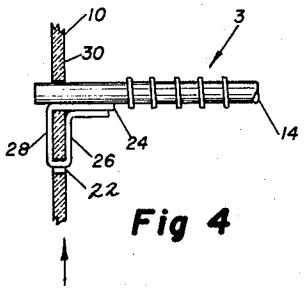


Fig 4

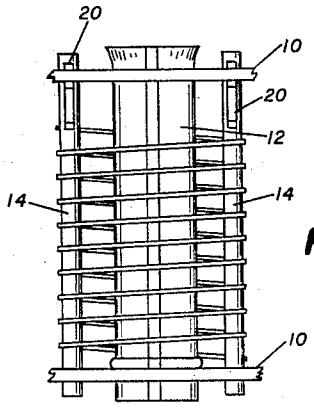


Fig 5

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United States Patent Office 2,956,196
Patented Oct. 11, 1960

2,956,196

STRAP AND PERFORATED INSULATOR ASSEMBLY

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Filed Apr. 18, 1955, Ser. No. 502,003

7 Claims. (Cl. 313—258)

This invention relates to insulating spacing wafer and strap assemblies such as are utilized in the construction of electron tubes.

In one type of electron tube there is employed a pair of spaced insulating wafers, as of mica, spanned by electrode elements, these elements being located suitably spaced apart by having end portions of the elements passed through preformed holes in the wafers and welded to straps or so called stops threaded through the holes of one of the wafers. These straps are usually of strap metal preliminarily threaded through a pair of adjacent holes and squeezed about the wafer to be firmly held by the wafer and positioned for welding to the electrode ends.

The holes are small and the strap is of thin material of a width slightly less than the diameter of the hole. Moreover the metal is preliminarily bent into staple shape to facilitate assembly. Accurate bending of the staple and accurate registration of the staple ends and wafer holes must therefore be attained in order to effect quick assembly of parts.

It is an object of this invention to give such form to the holes in the wafer as to make it easier to assemble parts.

It is a further object of the invention to so form the staple or strap to still further enhance the ease of strap and wafer assembly.

These and further objects will be understood in the light of the following description when taken in conjunction with the accompanying drawing in which:

Fig. 1 is a plan view of a wafer having perforations therethrough adapted to receive straps, these perforations being shaped in accordance with the invention.

Fig. 2 is a perspective view of a strap in its form preliminary to assembly with the wafer of Fig. 1.

Fig. 3 is a fragmental view of the wafer of Fig. 1 with the straps in place.

Fig. 4 is a fragmental sectional view through the wafer with a strap therein welded to a grid side rod, and

Fig. 5 is a fragmental elevational view of a mount utilizing my improved straps.

Referring to the drawings in greater detail, at **10** there is disclosed a pair of spacer discs each perforated as at **11** to receive electrode elements. In a pair of these openings is located the conventional cathode sleeve **12**. The perforations are made of a size, shape and position necessitated by the electrodes utilized in the tube. In the drawing there is illustrated a mica disc perforated to receive the electrodes of a beam power tube, type 6W6, although as will be obvious, the invention is applicable to other types of tube. In the beam power tube two nested grids with aligned lateral wires are utilized, the inner grid having side rods **14** insertible through openings **15** and the outer grid having side rods insertible through openings **16**.

To maintain the grid immovable, the openings **15, 16** are contoured to closely fit the side rods of the grids. In this instance the side rods are circular and so the

openings **15, 16** are generally circular. Should the rods be of other shape, the openings **15, 16** would conform thereto. The openings **15, 16**, fit the rod except for one portion of the wall of the openings here indicated as **18**. The wall portion at **18** extends beyond the projected periphery of the openings **15, 16** and the space left conforms with the thickness and width of a strap or grid stop **20** as will be explained. When the strap has a rectangular cross section, the bottom of the recess is a straight line. These spaces may be placed in one only of the discs.

Cooperative with each of the openings through which a strap end is to be inserted is an opening **22**. These openings **22** are spaced from the openings **15, 16**, the spacings for the pairs of openings being preferably made equal to one another, so that the same sized strap could be associated with any of the pairs of openings. The openings **22** as here shown are trapezoidal in form and taper in the direction of the openings **15** and **16** and the narrowest portion of each trapezoid terminates in a straight line base portion which substantially equals the width of the strap. The length of the openings **22** is chosen to allow for spreading of the legs **24, 26** of the straps with permissible variations in the angle of spread of the legs.

The straps are made of pliable metal, generally U-shaped, but with one leg **24** shorter than the other leg **26** and with the legs diverging from one another. The bight **28** of the U is flat and the internal length of the bight is substantially equal to the spacing between the closest edges of openings **15** and **22** or of openings **16** and **22**. The spread of the legs, i.e., the distance between the ends of the legs **24, 26**, is no greater than the distance between the most remote edges of the openings **15** and **22** or **16** and **22**. Therefore, considerable latitude in the spread of the legs is possible and yet permit of easy insertion of a strap in a pair of associated openings in the wafer. The width of the straps **20** is such as to cause the straps to fit snugly in the smaller ends of the openings **22** and in the recesses **18** when the straps are thrust home through the wafers. Although the openings **22** are shown as trapezoidal in form, it should be obvious that in accordance with this invention, the openings may partake of other shapes so long as the width increases in a direction away from the strap engaging edges of the openings when the strap is in home position. Likewise, the recesses **18** may partake of other shapes, but the rectangular recess **18** for the rectangular cross-sectioned strap shown gives the best results, particularly when the straps are welded to electrode components, as will be described.

The straps here shown are utilized to fasten grid side rods in place. After a strap has been inserted through a pair of wafer openings and against the upper surface of the wafer, it is bent by suitable instrumentalities so that the leg **24** projects perpendicularly to the bight portion **28** while the leg **26** is bent hard up against the under surface **30** of wafer **10**, and along the leg **24**. The side rod **14** of a wound grid is inserted through an opening in the wafer, as opening **15**, and welding electrodes are then applied to the rod and leg **26** of the strap to weld the portions of the strap to each other and to the side rod.

Having described the invention what is claimed as new is:

1. A wafer and strap assembly comprising a wafer provided with an opening for the reception of the end of an electrode element, a second opening spaced from the first opening, said first opening having a recess in a wall thereof and said second opening being of variable width with the narrowest part closest to said recess in the wall of the first opening, and a strap of a width to fit snugly

in said recess of the first opening and the narrowest part of the second opening, said strap being threaded through both of said openings with a portion overlying and in juxtaposition to one surface of the wafer, a second portion of the strap underlying and in juxtaposition to the opposite surface of the wafer, the strap also having leg portions extending at substantially a right angle to a surface of the wafer with the leg portions contacting one another.

2. In an electron tube construction, an insulating wafer with an opening therein, an electrode having a portion extending through said opening, a second opening in said wafer, said second opening being narrow where it is closest to the first opening and expanding in a direction away from said first opening, a strap passing through both of said openings of a width to fit snugly in the narrow portion of said second opening and bearing tightly against the wafer between the openings, said strap having legs extending along the electrode and fastened thereto.

3. In an electron tube construction, an insulating wafer with an opening therein, an electrode having a portion extending through said opening, a second opening in said wafer, said second opening being trapezoidal in form and narrowest where it is closest to the first opening and expanding in a direction away from said first opening, a strap passing through both of said openings of a width to fit snugly in the narrowest portions of said second opening and bearing tightly against the wafer between the openings, said strap having legs extending along the electrode and fastened thereto.

4. In an electron tube construction, an insulating wafer with an opening therein, an electrode having a portion extending through said opening, said opening being enlarged to allow space for positioning of a strap between said electrode portion and the wall of said opening, a second opening in said wafer, said second opening being narrow where it is closest to the enlargement of the first opening and expanding in a direction away from said first opening, a strap passing through the enlargement in said first opening of a width to fit snugly in the narrow portion of said second opening and through the narrow portion of said second opening and tightly engaging the girth of the wafer material between the first and second

openings, said strap having legs extending along the electrode and fastened to each other and to the electrode.

5. A wafer provided with a perforation for the reception of an end of an electrode element, a second perforation in noncommunicating relation to the first perforation and closely spaced therefrom, the wafer providing an unbroken surface between the perforations, said first perforation having a recess in a wall thereof, and said second perforation being of variable width and devoid of reentrant portion with the narrowest part closest to said recess in the wall of said first perforation and terminating in a straight line base portion.

6. A wafer provided with a perforation for the reception of an electrode element, a second perforation in noncommunicating relation to the first perforation and closely spaced therefrom, the wafer providing an unbroken surface between the perforations, said first perforation having a recess in a wall thereof, and said second perforation being in the form of a trapezoid having nonparallel sides, with the nonparallel sides tapering toward the recess in the wall of said first perforation.

7. A wafer provided with a perforation for the reception of an end of an electrode element, a second perforation in noncommunicating relation to the first perforation and closely spaced therefrom, the wafer providing an unbroken surface between the perforations, said first perforation having a recess in a wall thereof with a straight line bottom, and said second perforation being in the form of a trapezoid having a pair of parallel ends and nonparallel sides with the nonparallel sides tapering toward the recess in the wall of said first perforation and the smallest end parallel to the straight line bottom of the recess in the wall of the first perforation.

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