Oct. 14, 1969 J. W. SCHWARTZ ET AL 3,473,065

OVER-SCANNING SHIELD PROVIDED IN COLORED TELEVISION TUBE BETWEEN THE MASK SUPPORT AND THE TUBE

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FIG. 1.

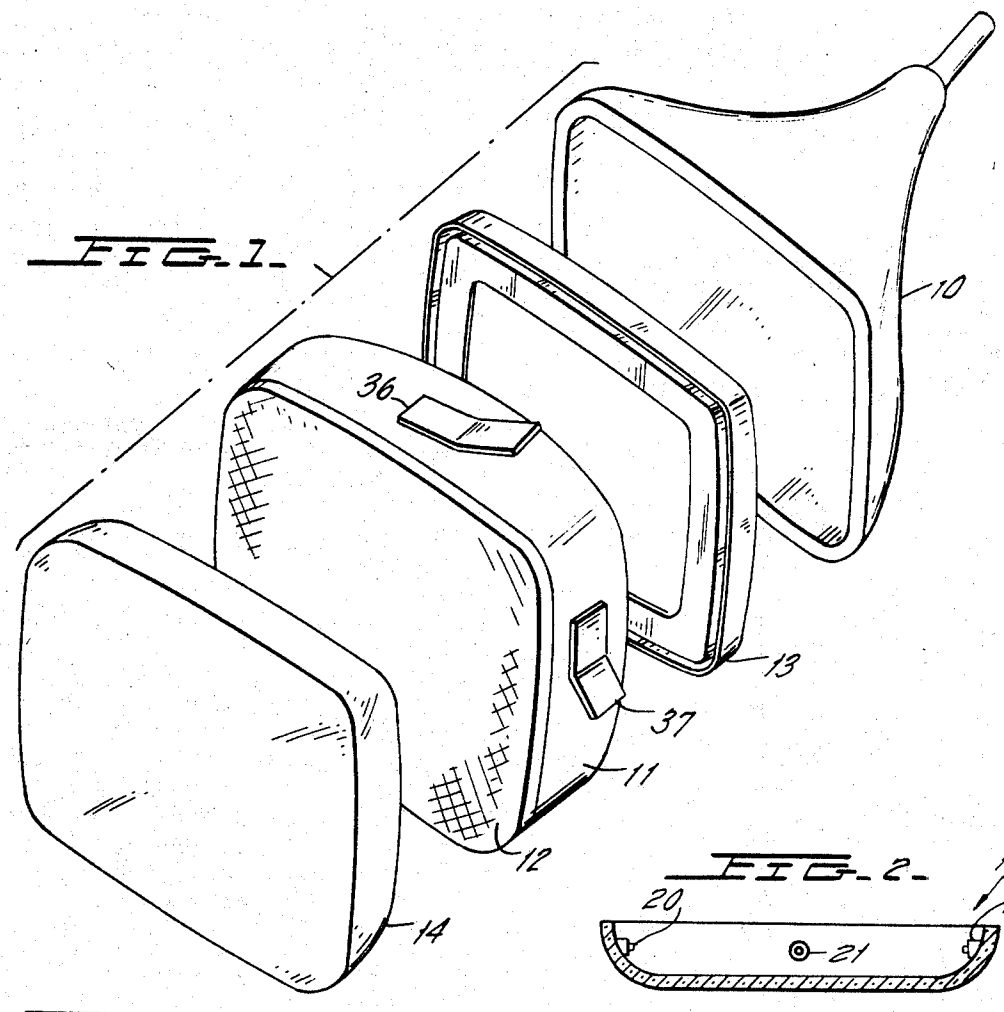


FIG. 2.

FIG. 3.

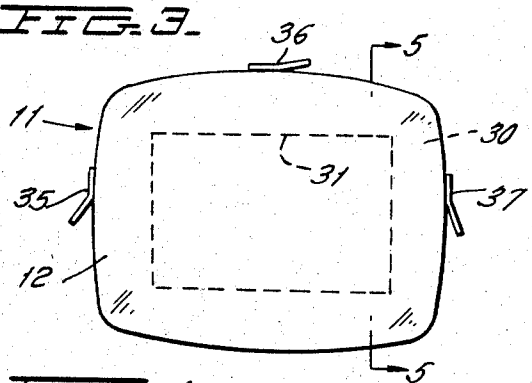
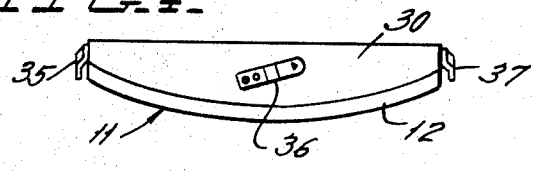


FIG. 4.



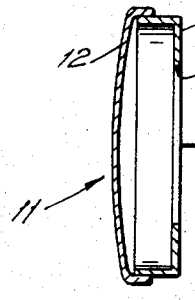


FIG. 5.

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FIG. 6.

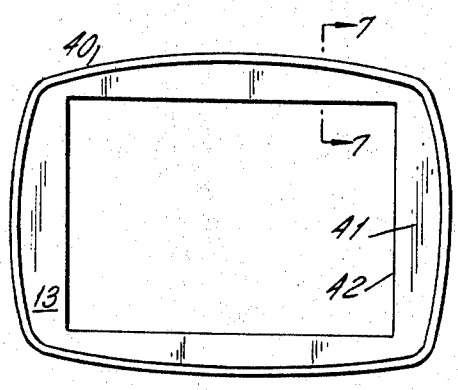


FIG. 7.

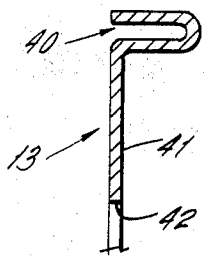
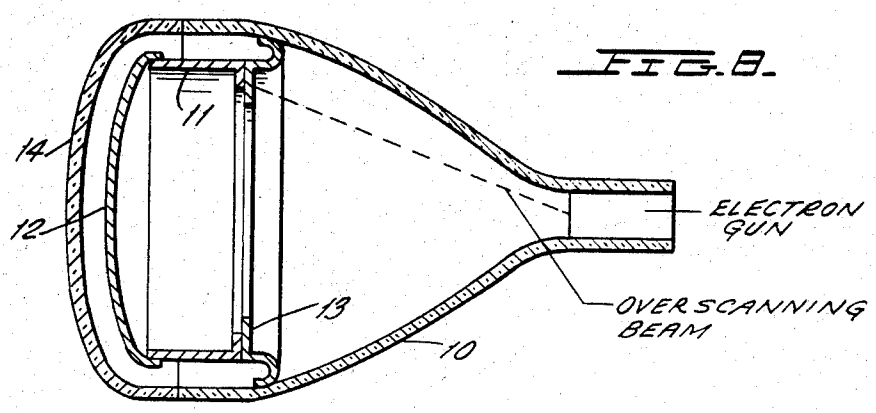


FIG. 8.



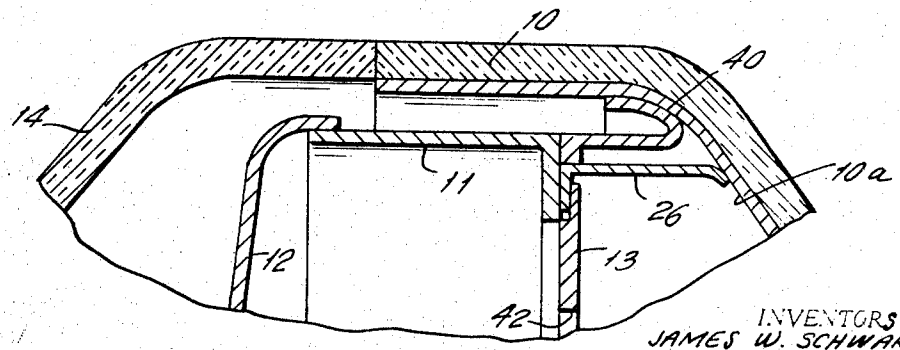


FIG. 9.

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OVER-SCANNING SHIELD PROVIDED IN COLORED TELEVISION TUBE BETWEEN THE MASK SUPPORT AND THE TUBE

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Int. Cl. H01j 29/46
U.S. Cl. 313—85 5 Claims

ABSTRACT OF THE DISCLOSURE

This invention involves a novel shield against over-scanning in a color television tube wherein the shield is formed of a continuous conductive foil having a rolled-over edge which is carried by and compressed between the mask support structure and the tube funnel.

This invention relates to color television picture tubes, and more specifically relates to a novel shield structure within the tube to eliminate the adverse effects of over-scanning.

It is well known in the color television tube art that a shielding means should be disposed about the inner periphery of the tube adjacent the front plate of the tube to intercept primary and reflected electrons from the side walls of the tube funnel caused by over-scanning of the electron gun. Such electrons if not intercepted will result in spurious excitation of the phosphor coating of the tube face causing undesired white streaks to occur in the color picture.

Shields for this purpose of thin conductive metal have been secured to the interior of the tube and between the mask and funnel by welding. This welding, however, can result in sparks and the possible transfer of copper to the phosphor tube coat. The copper in the phosphor coat will then affect the color response of the coat.

The principle of the present invention is to provide a novel shield against over-scanning in a color television tube wherein the shield is formed of a continuous conductive foil having a rolled-over edge which is carried by and compressed between the mask support structure and tube funnel.

The shield of the present invention will be held securely in place without the necessity of welding and will, at the same time, be an effective barrier and prevent over-scanning electrons from affecting the picture.

Accordingly, a primary object of this invention is to eliminate the need for welding of an over-scanning shield to the funnel of a color television tube.

Another object of this invention is to provide a novel continuous foil which has a rolled-over edge which is received solely by the mask support structure of a color television tube with the foil serving as an over-scanning prevention means.

Still another object is to provide a one-piece shield which is sufficiently flexible to fit tightly and securely between the mask frame and glass envelope irrespective of small dimensional changes in the frame and envelope.

These and other objects of this invention will become apparent from the following description when taken in connection with the drawing, in which:

FIGURE 1 is an exploded perspective view of a color television tube which incorporates the shield of the present invention.

FIGURE 2 is a side cross-sectional view showing the glass front plate of FIGURE 1.

FIGURE 3 is a front view of the mask assembly of FIGURE 1.

FIGURE 4 is a top view of FIGURE 3.

FIGURE 5 is a cross-sectional view of FIGURE 3 taken across the lines 5—5 in FIGURE 3.

FIGURE 6 is a front view of the foil shield of the present invention.

FIGURE 7 is a cross-sectional view of FIGURE 6 taken across the lines 7—7 in FIGURE 6, and illustrates the rolled edge of the foil.

FIGURE 8 is a cross-sectional view of the assembled tube incorporating the novel shield of the invention.

FIGURE 9 shows an enlarged cross-sectional view of the manner in which the shield is supported and connected to the funnel along with supplementary contact spring means.

Referring first to FIGURE 1, there is illustrated therein a typical color television tube which comprises a glass funnel **10** which may have an electrically conductive interior, and which receives internally thereof a mask support structure **11** which carries a mask **12** as an integral part thereof.

A shield **13** which is the subject of the present invention is then interposed between mask assembly **11** and the funnel **10**, being compressed between the mask frame and the inner conductive surface of the funnel **10**.

When the device of FIGURE 1 is assembled, it will be seen that the frame assembly **11** and shield **13** are contained between the interior of the funnel **10** and the glass face plate **14**. The narrow end of the funnel will contain suitable electron gun means and focusing means in the usual manner.

The funnel **10** is shown in FIGURES 8 and 9, and is of the standard glass construction with the extending funnel walls with a carbon-containing or other suitable conductive coating shown as coating **10***a* in FIGURE 9. Face plate **14** is also suitably prepared with the usual coating on the interior thereof, and is provided with a plurality of support buttons **20**, **21** and **22** which carry the mask support structure **11**, as shown in FIGURE 2.

The mask support structure **11** is best shown in FIGURES 3, 4 and 5 and is comprised of a generally L-shaped cross-section annular metal member **30** which defines a rectangular opening **31** in the rear thereof. A suitable mask **12** is then directly secured over the outer periphery of the support member **30** as shown. The support member **30** is then provided with a plurality of spring members shown as elements **35**, **36** and **37** on the sides thereof which have outwardly extending end portions and which are each suitably connected to the support **30** as by riveting or welding. Springs **35**, **36** and **37** of FIGURES 1, 3 and 4 connect to support buttons **20**, **21** and **22** of FIGURE 2 in a snap-in type arrangement to secure the mask **12** and mask support frame **11** in position with respect to face plate **14** in the usual manner.

The novel shield of the present invention is best shown in FIGURES 6 and 7 and is shown in position with respect to the assembled components in FIGURES 8 and 9.

Thus, in FIGURES 6 and 7, the shield **13** is constructed of a generally annular metallic foil which may be of aluminum having a thickness which may be of the order of 5 mils.

The shield **13** has a re-entrantly bent outer periphery **40** which extends from a central web **41**. A rectangular-shaped opening **42** then defines the end of web **41**. The web **41** serves as the shielding portion of the shield structure and extends around the outer periphery of the mask **12**, in order to effect the desired shielding action. It will be noted that since the web **41** is of a thin foil it can be compressed into shape during the assembly of the tube

and maintains itself in a secure position during heating and compression operations of the assembly step.

As further shown in FIGURE 9, the mask frame **11** may also have secured to it a spring **26** which passes through an opening in the foil shield and makes further contact with the conductive interior surface of the funnel.

Although this invention has been described with respect to its preferred embodiment, it should be understood that many variations and modifications thereof will now be obvious to those skilled in the art, and it is preferred, therefore, that the scope of the invention be limited not by the specific disclosure hereof, but only by the appended claims.

The embodiments of the invention in which an exclusive privilege or property is claimed are defined as follows:

1. A shield for shielding against over-scanning in a color television tube; said color television tube comprising a glass funnel, a glass face plate having a generally dished shape connected to said funnel about the largest outer periphery of said funnel, and a mask and frame assembly supported within said dished shape glass face plate; said shield comprising a continuous deformable thin conductive foil having an enlarged opening therethrough to permit passage of an electron beam through the major area of said mask; said shield having a web portion extending from said opening to the outer periphery thereof; said outer periphery of said shield being interposed between adjacent annular surface portions of the mask support frame and the interior of said funnel and being secured therebetween by pressure contact with said adjacent annular surface portions.

2. The device as set forth in claim **1** wherein said outer periphery of said shield comprises a re-entrantly folded section extending substantially at right angles to said web portion.

3. The device of claim **1** wherein said shield outer periphery comprises a rim portion bent substantially perpendicular to said web portion; said web portion having a substantially constant radial length of approximately 1 inch.

4. The device of claim **1** wherein said shield is constructed of metallic foil having a thickness of approximately 5 mils.

5. The device of claim **4** wherein said rim portion comprises a double thickness section of said foil defined by a re-entrant bend of said foil at the outer periphery thereof.

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U.S. Cl. X.R.

313—313