# United States Patent

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[73] Assignee **Sylvania Electric Products Inc.**
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[54] **SUPPORT MEANS FOR A COLOR CATHODE RAY TUBE SHADOW MASK MEMBER HAVING SMOOTH CIRCUMFERENTIAL SEATING CONTACT**
**5 Claims, 5 Drawing Figs.**


[52] **U.S. Cl.** ..... **313/85,** 313/292
[51] **Int. Cl.** ..... **H01j 29/46,** H01j 1/88
[50] **Field of Search** ..... 313/64, 85S, 92Sh, 292



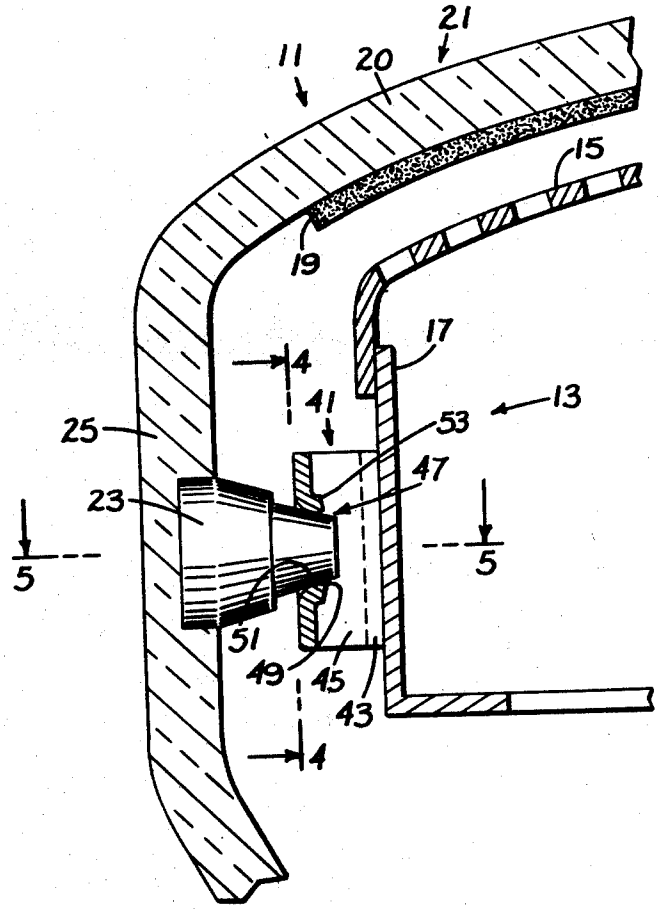
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**ABSTRACT:** Means for supporting an electrode member in a cathode ray tube, in the region adjacent the screen area, are delineated as substantially resilient supporting members having discrete apertures formed therein to receive compatible positioning means protruding from the panel sidewall. The material portion of each supporting member, wherein the aperture is defined, has a funnel shaping imparted thereto to facilitate facile and positive mating of the supporting member with the positioning means.

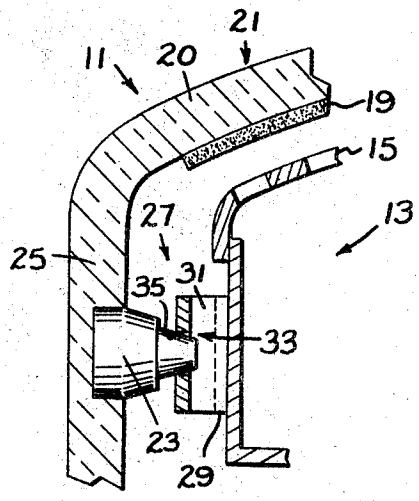



Fig. 1
PRIOR ART

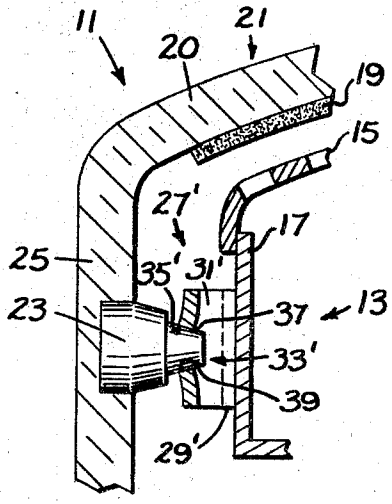



Fig. 2
PRIOR ART

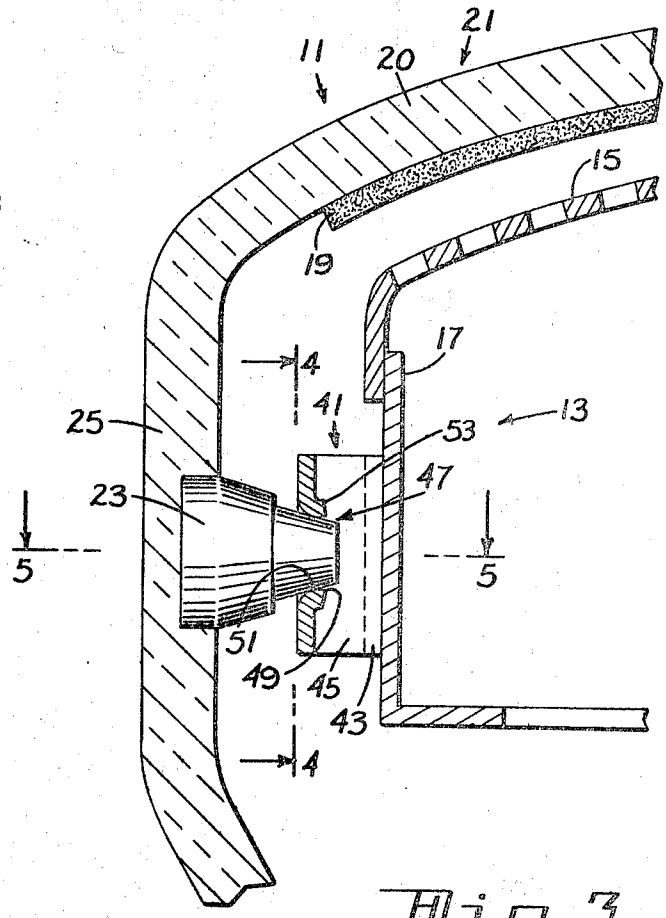



Fig. 3

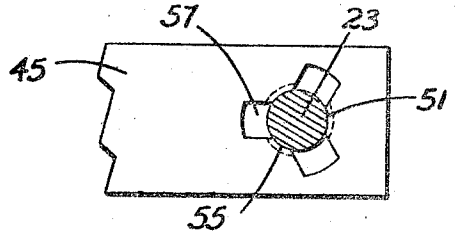



Fig. 4

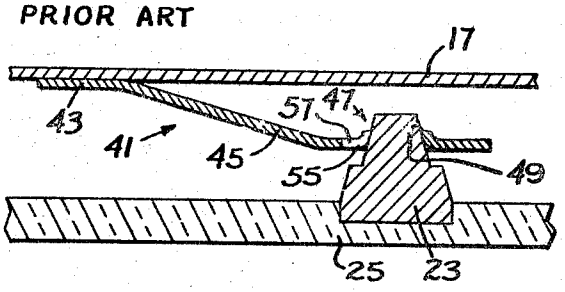



Fig. 5

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# SUPPORT MEANS FOR A COLOR CATHODE RAY TUBE SHADOW MASK MEMBER HAVING SMOOTH CIRCUMFERENTIAL SEATING CONTACT

## BACKGROUND OF THE INVENTION

This invention relates to cathode ray tubes and more particularly to means for supporting an electrode member in a position adjacent to the cathodoluminescent screen.

One form of such electrode structure is exemplified by the foraminous shadow mask electrode commonly utilized in one type of color cathode ray tube construction wherein the mask is supported within the face panel portion of the tube envelope in spaced adjacency to the screen. Conventional mask supporting means usually comprise a plurality of spaced apart metallic resilient members having base portions affixed to the periphery of the mask with free leaflike portions extending from the respective members in orientation with a like number of positioning means protruding inwardly from the sidewall of the face panel portion. Since the mask is removed from the panel several times during the usual procedures utilized in the forming of the several color screen patterns, it is important that the mask be accurately repositioned within the panel after each removal. To facilitate precise mask repositioning, each of the several resilient mask supporting members incorporates an aperture in the leaflike portion, adjacent the free end thereof, fashioned to receive a corresponding positioning projection such as a tapered stud affixed in the panel sidewall. By one conventional practice, the apertures are formed to be substantially square with the flat leaflike portion, thereby producing an opening having a sharply defined leading edge which seats on the tapered stud. Another type of aperture has the material of the aperture facing, intermediate the leading and trailing edges of the leaf, shaped in an angular manner to effect seating of the aperture facing on the surface of the tapered stud. Both of the aforedescribed apertures have sharply defined leading edges which, upon repeated insertion, are apt to score the surface of the stud thereby causing hangup of the supporting member which introduces minute but deleterious errors in mask positioning. Additionally, the sharp leading edge of the aperture complicates insertion of the mask supporting member onto the panel stud.

## OBJECTS AND SUMMARY OF THE INVENTION

It is an object of the invention to reduce the aforementioned disadvantages and to provide a color cathode ray tube wherein the mask support means has improved contact relationship with the mask positioning means integral with the face panel of the tube. Another object is to provide facile positioning of the mask in the panel.

The foregoing objects are achieved in one aspect of the invention by utilizing mask support means in the form of a plurality of resilient mask support members each having an aperture discretely formed therein to receive the positioning studs protruding from the panel sidewall. The material defining each of the respective apertures is partially rolled in a coined manner in a direction away from the positioning studs to impart a funnel shaping to the peripheral definition of the aperture. By such shaping, the terminal lip defining the aperture is rounded or rolled as a continuation of the funnel effect to provide smooth circumferential seating contact with the positioning stud means.

## BRIEF DESCRIPTION OF THE DRAWINGS

FIGS. 1 and 2 are sectional views showing prior art contact relationship between the mask support means and the mask positioning means;

FIG. 3 is an enlarged sectional view illustrating the contact relationship embodied in the invention;

FIG. 4 is a plan view of the aperture portion of the resilient member taken along the line 4–4 of FIG. 3; and

FIG. 5 is a sectional view taken along the line 5–5 of FIG. 3 showing the relationship between the resilient support member and the panel stud.



## DESCRIPTION OF THE PREFERRED EMBODIMENT

For a better understanding of the present invention, together with other and further objects, advantages and capabilities thereof, reference is made to the following specification and appended claims in connection with the aforedescribed drawings.

With reference to the drawings, FIGS. 1, 2 and 3 show partial views of a color cathode ray tube 11 wherein a shadow mask 13, comprised of foraminous portion 15 and a supporting frame 17, is oriented in spaced adjacency to the cathodoluminescent screen 19 disposed on the interior surface of the viewing area 20 of the face panel 21. Mask positioning means, such as for example a plurality of positioning studs 23, of which only one is shown, are affixed to the panel sidewall 25 in a manner to protrude inwardly therefrom into the tube cavity.

Prior art mask supporting means are shown in FIGS. 1 and 2 wherein mask supporting members 27 and 27′ are related to the mask positioning studs 23. Each of the supporting members 27 and 27′ has a respective base portion 29, 29′ which is affixed or bonded to the periphery of the mask frame. Extending integrally from the respective base portions are substantially resilient free leaflike portions 31, 31′, each of which has a discretely formed aperture 33, 33′ fashioned therein adjacent the free end thereof to receive a corresponding positioning stud.

The aperture 33, being formed in a manner substantially square with the leaf portion, has a sharply defined leading edge 35 which seats on the taper of the stud 23. Repetitive seating of this acute contact edge has often caused aggravating scoring of the stud and resultant hangup of the support members 27 thereon which changes positioning of the mask in relation to the screen. The aperture 30′ has the material of the aperture facing, which substantially represents the material thickness intermediate the leading edge 35′ and the trailing edge 37, angled to provide seating of the aperture facing 39 on the tapered stud. As with the previous prior art example, the surface of the stud is vulnerable to scoring by the sharply defined leading edge 35′.

Applicant has found that the aforementioned disadvantages of the prior art are overcome by his invention. With particular reference to FIGS. 3, 4 and 5 there is shown an improved resilient support member 41 having a base element 43 and an integrally extending leaflike element 45. The improved aperture 47 discretely formed therein is fashioned to provide a smooth circumferential seating contact on the surface of the protruding stud. This is accomplished by partially rolling the material contiguous to each aperture in a substantially coined manner in a direction away from the stud positioning means. Such coining imparts a substantially funnel shaping to the peripheral definition of the aperture wherein the leading edge 49 is rolled as a continuation of the funnel effect to produce a terminal defining lip 51 which provides a smooth rounded seating contact free of a sharp seating edge. The aperture facing 53 is oriented in a manner to avoid contact with the surface of the stud.

While the improved aperture can be formed to have a substantially continuous circumferentially rolled terminal defining lip, it may also be fashioned to provide a plurality of spaced apart lands 55 which are substantially rolled or coined to effect a funnel shaping thereto, such are shown in FIGS. 4 and 5. The aperture is configurated to have a plurality of radially oriented and spaced apart cutouts 57, which provide therebetween, at least three seating lands 55. The leading edges of the several lands are each coined or rolled to collectively provide the funnel shaping for the aperture. The terminal rolled lip portions of the plural lands provide smooth seating contact for the positioning stud.

Thus, there is provided an improved mask support means that has an improved contact relationship with the mask positioning means integral with the envelope portion of the tube. This improved relationship not only facilitates positioning of the mask in the panel but also provides for repetitive accurate seating of the mask support member on the positioning stud.

While the support means for positioning a shadow mask structure in a color cathode ray tube have been described, the invention is not intended to be limited solely thereto, as the concept equally applies to the supporting of other electrode members which may be oriented on protruding positioning means within an envelope structure.

While there have been shown and described what are at present considered the preferred embodiments of the invention, it will be obvious to those skilled in the art that various changes and modifications may be made therein without departing from the scope of the invention as defined by the appended claims.

I claim:

1. In a cathode ray tube having a framed electrode member oriented adjacent the cathodoluminescent screen, support means integrally associated with the frame of the electrode member and formed to cooperate with related positioning means protruding from the wall of the tube envelope, said support means comprising a plurality of resilient members attached to said electrode frame in a manner spacedly related to said protruding positioning means, each of said resilient members having an aperture discretely formed in the material



thereof to receive the insertion of said protruding means and provide circumferential seating contact thereon, the member material contiguous to each of said apertures in a direction away from said positioning means to substantially impart a funnel shape to the peripheral definition of each aperture to facilitate facile and positive mating of the aperture portion of said resilient member with said protruding positioning means.

2. The support means according to claim 1 wherein each of said apertures has a terminal defining lip in the form of a rounded continuation effect of said funnel shape to provide said smooth circumferential seating contact with said related positioning means.

3. The support means according to claim 2 wherein said aperture has a plurality of spaced apart lands which are substantially of funnel shape.

4. The support means according to claim 3 wherein said formed funnel shape lands are at least three in number.

5. The support means according to claim 3 wherein substantially the terminal rounded lip portion of each of said lands makes seating contact with said protruding positioning means.

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(5/69)

# UNITED STATES PATENT OFFICE
# CERTIFICATE OF CORRECTION

Patent No. 3,553,517 Dated January 5, 1971

Inventor(s) Joseph Nazzareno DeBernardis

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 2, line 34, "30'" should read "33'".

Column 4, Claim 1, line 3, after "apertures" insert the following: --- having a smooth rounded circumferent seating contact oriented ---

Signed and sealed this 30th day of March 1971.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

WILLIAM E. SCHUYLER, JR
Commissioner of Patents