April 25, 1950 M. B. HERSCHER ET AL 2,505,736

ART OF MOUNTING ELECTRON IMAGE TUBES

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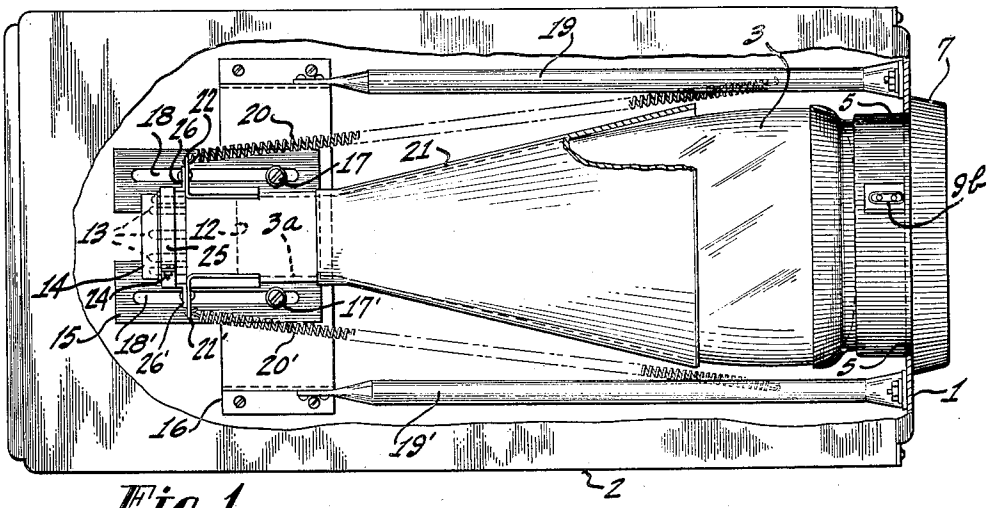


Fig. 1.

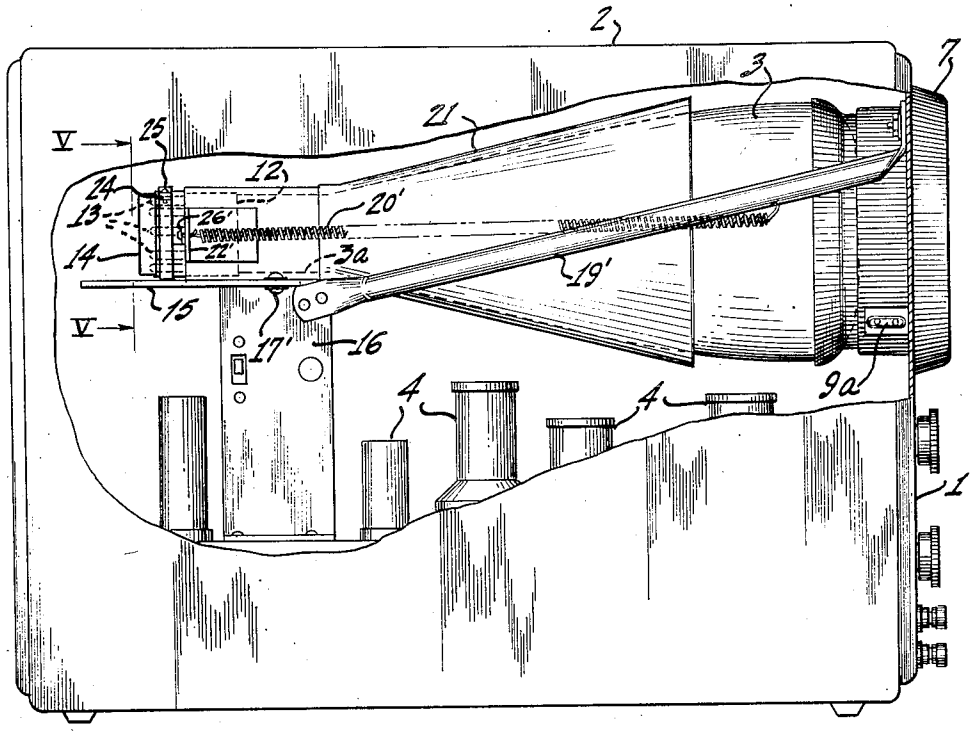


Fig. 2.

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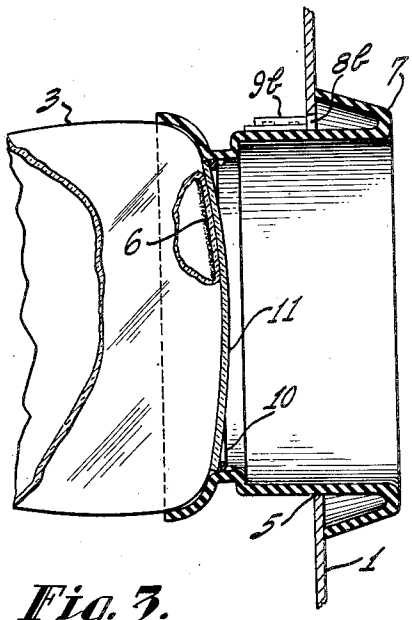


Fig. 3.

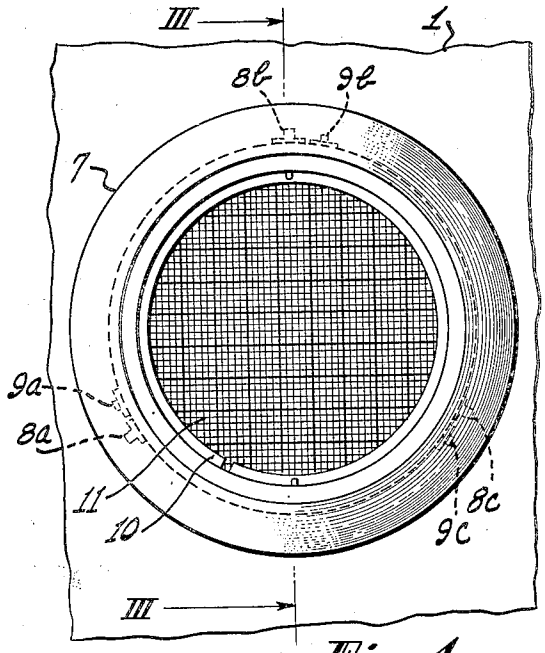


Fig. 4.

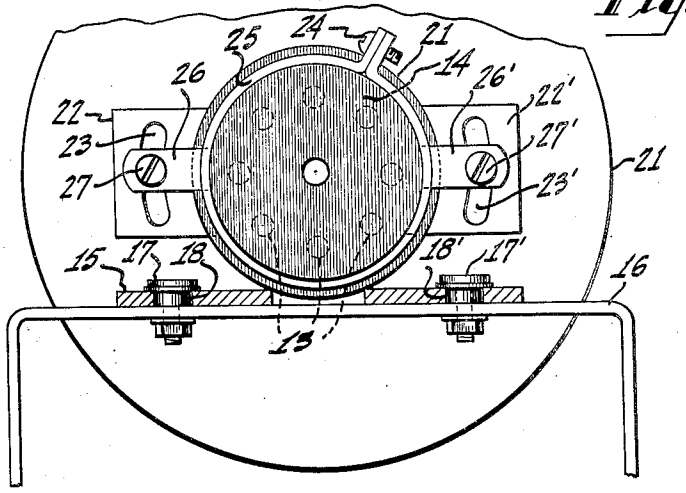


Fig. 5.

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ART OF MOUNTING ELECTRON IMAGE TUBES

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4 Claims. (Cl. 250—27.5)

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This invention relates to the art of mounting electron tubes, particularly so-called "image tubes," and will be described as applied to the mounting of a cathode-ray tube in the cabinet of an oscilloscope.

The cathode-ray tubes employed in modern oscilloscopes may be provided with electron-sensitive screens of various types. Thus, one cathode-ray tube may be provided with a conventional green (willemite) screen, another with a black and white (zinc cadmium sulphides) screen and still others with long-persistence (dual layer, cascade-phosphor) or short-persistence (single layer, activated) screens. Since the different electrical tests for which the oscilloscope is designed may dictate the use of different cathode-ray tubes it is obviously desirable to make some provision for facilitating the substitution of one tube for another.

Accordingly, the principal object of the present invention is to provide an improved cabinet-mounting for cathode-ray and other image-tubes, and one wherein the tube may be entered into and withdrawn from the cabinet of the unit through the window to which the screen of the tube is presented.

In the accompanying drawings: Fig. 1 is a top plan view, partly broken-away, of an oscilloscope cabinet containing a cathode-ray tube mounted in accordance with the principle of the present invention, Fig. 2 is a side elevation, with the cabinet broken-away, of the tube mounting; Fig. 3 is a sectional view taken on the line III—III of Fig. 4 showing the screen-end of the tube and a removable light-shield therefor, Fig. 4 is a front elevation of the screen and light-shield and Fig. 5 is a rear view, in partial section, taken on the line V—V of Fig. 2.

In the cathode-ray oscilloscope shown in the accompanying drawings 1 designates, generally, the control panel of a cabinet 2 within which the cathode-ray tube 3 and other electrical parts 4 of the unit are housed. The control panel 1 is at the front of the cabinet and contains an aperture or window 5 of a diameter sufficiently large to permit the tube 3 to be entered into the cabinet 1 and through which the fluorescent screen 6 of the tube 3 may be viewed when the tube is mounted within the cabinet. This window 5 normally contains an escutcheon in the form of a tubular soft-rubber or felt shell 7 which extends beyond the inner and outer surfaces of the panel 1 whereby it serves both as a light-shield for the fluorescent screen 6 (see Fig. 3) and as a stationary support for the screen-

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end of the tube 3. As shown more clearly in Fig. 4 the periphery of the window is provided with three slots or keyways 8a, 8b, 8c spaced 120° apart and the tubular supporting shield 7 is provided on its outer surface with three similarly spaced keys 9a, 9b, 9c which, when turned by rotating the shield, serve to lock the said member 7 within the window 5. If desired, a split-ring 10 (Figs. 3 and 4) may be provided on the interior of the tubular shield 7 for removably-securing a transparent chart 11 adjacent to the screen-end of the tube 3. (Such charts are commonly employed in cathode-ray oscilloscopes for measuring the horizontal and vertical components of the pattern traced by the electron-beam upon the fluorescent screen of the tube.)

The cathode-ray tube 3, here shown, is of a conventional shape and includes, in addition to its bulbous screen-portion, a dependent neck portion 3a which terminates in a base 12 through which the electrode terminals 13 (Figs. 1 and 2) of the tube project. Electrical connections are made to the tube terminals 13 through a socket 14 which is mounted, in accordance with the present invention, for movement along a path normal to the plane of the window 5. The carriage in the instant case comprises simply a flat metal plate 15 which is mounted for slidable movement on an inverted U-shape pedestal 16. Two screws or similar projections 17 and 17' on the flat top of the pedestal 16 fit in parallelly arranged slots 18 and 18' in the plate or carriage 15 and serve to guide and to limit its forward and rearward movement. Two struts 19 and 19' affixed at one end to the pedestal 16 and at the other end to the rear surface of the front panel 1 serve to brace the assembly and, further, serve as a convenient anchor for the forward ends of two coil springs 20 and 20' which are connected at their inner ends to the carriage 15 and serve to bias the said movable support to its forward position.

The slidable plate 15 carries, in addition to the socket 14, a funnel-shape metal magnetic-shield 21 within which the cathode-ray tube 3 is received. In the instant case (see Fig. 5), the shield 21 is welded or otherwise permanently affixed to the plate 15 and carries two oppositely located, outwardly extending arms 22 and 22', each of which is provided with a vertically extending arcuate slot 23, 23', respectively. The socket 14 within which the electrode terminals 13 of the tube are received is held, as by means of a screw 24, in a clamp 25 and the clamp is mounted by means of integral ears 26, 26' and

pins 21, 21' in the arcuate slots 23, 23', to permit of a limited degree of rotary movement. Such freedom of rotary movement facilitates alignment of the socket terminals with the tube terminals, while the tube is being inserted in the socket 14.

The following procedure is recommended in removing the image tube 3 from the cabinet: (a) Turn the light shield 7 slowly until the keys 9a etc. thereon "snap" into the keyways 8a etc. and the shield starts to move forward, (b) remove the light shield, (c) grasp the screen-end of the tube 3 and pull it forward and out through the window 5.

To mount the tube (3) in the cabinet 2, (a) pass the tube, neck-end first, through the window 5, all the way into the tube shield 7, (b) turn the tube about its long axis, to bring its prongs into register with the socket terminals (the prongs are properly registered when the said rotary movement is halted) and then push to seat the said prongs in the socket, (c) gradually release the force required in seating the prongs and thereby permit the tube to move forward on the carriage 15 under the influence of the springs 20, 20', (d) place the light shield 7 against the screen-end of the tube, line-up the keys 9a, etc. with the keyways 8a, etc., press in, (e) turn the shield to lock it in position. When the tube is energized the pattern on its screen (when observed in conjunction with the chart 11) may indicate that the horizontal and vertical axes of the tube are not properly located. In this case, turn the light shield 7 in the direction necessary to provide the proper adjustment and, if the adjustment is still not achieved, place a hand through the open center of the said shield, push against the tube (to relieve the force of the biasing springs 20, 20') and turn the tube in the proper direction.

It will now be apparent that the present invention provides an improved mounting for cathode ray and other image tubes and one wherein the tube may be entered and withdrawn from the cabinet of the unit through the window to which the screen of the tube is presented.

What is claimed is:

1. Electrical apparatus comprising a cabinet adapted to accommodate an electron-image tube and having a window through which said tube may be entered into said cabinet, a socket for said tube mounted for movement within said cabinet in register with said window whereby

said tube may be entered into said cabinet through said window and seated in said socket, a removable escutcheon for said window in which the screen of said image-tube is adapted to be framed, and means for moving said socket and hence said tube toward said window whereby to frame said tube-screen in said escutcheon'

2. The invention as set forth in claim 1 and wherein said removable escutcheon is constituted of a yieldable material and comprises a stationary support for the screen-end of said image tube.

3. The invention as set forth in claim 2 and wherein said stationary support extends beyond the exterior surface of said cabinet and comprises a light-shield for the screen of said image tube.

4. Electrical apparatus comprising a cabinet adapted to accommodate an electron-tube of the type having a viewing-screen adjacent to one end and electrode terminals projecting from its other end, said cabinet having a window through which said tube may be passed, a carriage for said tube mounted for slideable movement in said cabinet in line with said window, a socket for said electrode terminals mounted to permit of a limited degree of rotary movement on said carriage whereby said socket may be oriented to receive said electrode terminals, an apertured support for said screen-end of said tube removably mounted in said window, and means for moving said carriage and hence said tube toward said window whereby to bring said screen-end of said tube into engagement with said apertured support.

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