June 14, 1955 D. CRANE ET AL 2,710,904

PRESSURE SETTING FIXTURE

Filed May 12, 1954

FIG 1

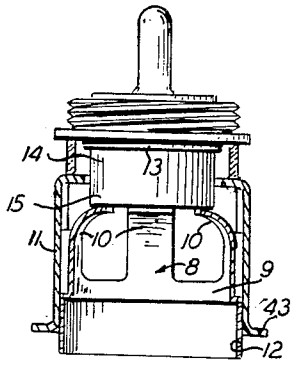


FIG 2

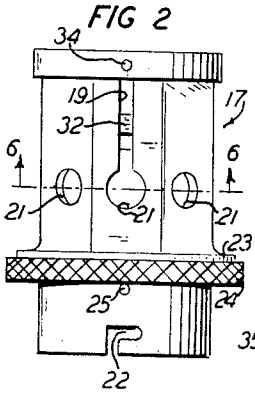


FIG 4

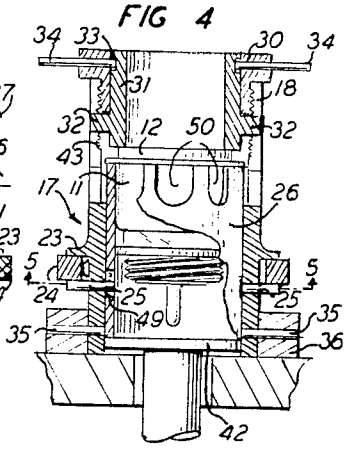


FIG 3

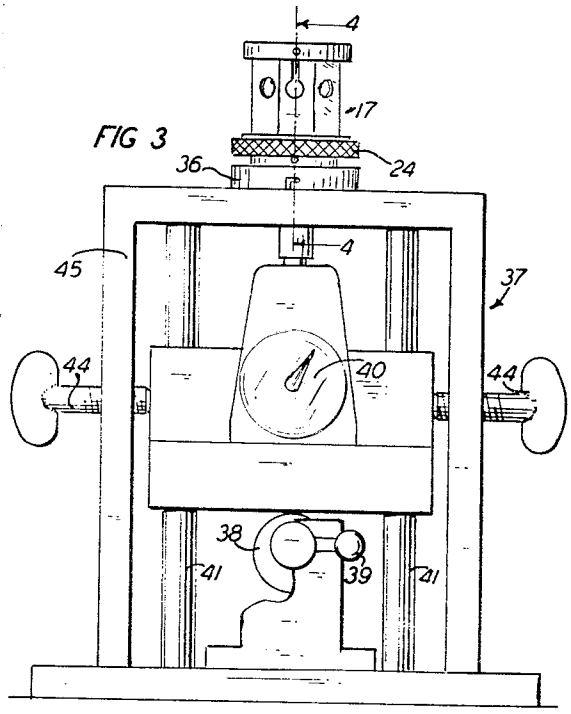


FIG 5

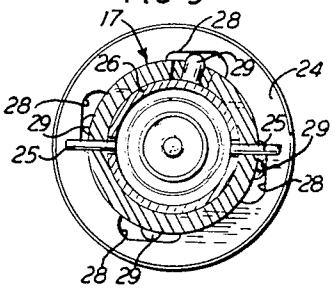


FIG 6

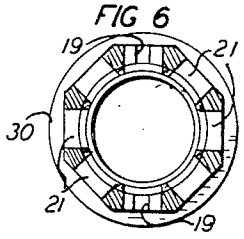
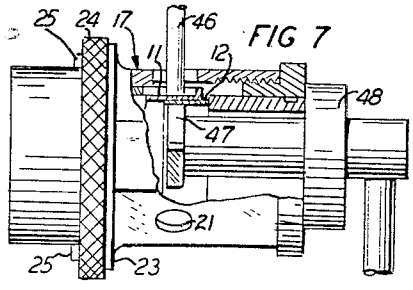


FIG 7



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PRESSURE SETTING FIXTURE

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6 Claims. (Cl. 219—17)

This invention relates to an assembly fixture and particularly to a pressure setting fixture used in the assembly of electronic tube structures.

Some electron tubes, such as the Western Electric Company type 416 triode which is widely used in microwave systems, contain certain pre-stressed resilient parts which exert pressure on and position other parts in the tube. In the fabrication of such tubes it is important that these parts be accurately pre-stressed and held in such condition while they are permanently fixed in position.

It is, therefore, the object of this invention to provide a device in which such parts may be accurately assembled under prescribed tension and which will hold the pre-stressed parts in such condition while they are permanently fixed in the tube.

In general, the fixture comprises a frame, a device or main housing movably attached to the frame for holding a multi-part assembly, means on the frame for applying a predetermined force to the assembly to force the parts into proper position in the device and clamping means on the device for holding the assembled parts in fixed relationship.

According to a feature of the invention, apertures are provided in the device for admitting welding electrodes for welding the assembled parts together.

These and other features of the invention will be more readily understood from the following detailed description taken in conjunction with the accompanying drawing, in which:

Fig. 1 is a side elevational view, partially in section, showing the pertinent parts of a Western Electric Co. type 416 vacuum tube;

Fig. 2 is a side elevational view of the parts holding main housing of the fixture;

Fig. 3 is a side elevational view of the fixture according to the invention;

Fig. 4 is a cross-sectional view of the fixture along the plane of line 4—4 of Fig. 3;

Fig. 5 is a cross-sectional view of the locking ring and pins actuated thereby as seen along the plane of line 5—5 of Fig. 4;

Fig. 6 is a cross-sectional view of the main housing through the plane of line 6—6 of Fig. 2, and

Fig. 7 is a partially broken away view of the main housing with associated welding apparatus.

The fixture shown in the drawing is used for assembling the grid and associated parts of the Western Electric Company type 416 triode the pertinent parts of which are shown in Fig. 1. The tube is similar to that disclosed in U. S. Patent 2,527,127 issued October 24, 1950, to R. S. Gormley, C. Maggs and L. F. Moose. In this assembly, a spring member 8, having a flanged ring portion 9 with lever spring arms 10 extending therefrom, is held pre-stressed within the metal bulb 11 of the tube by the metal retaining ring 12 welded to the bulb. Grid 13, insulators 14 and 15 and other parts not pertinent to the understanding of the invention are secured in their correct positions by the spring tension. These parts will be referred to as the grid assembly in the description which follows.

As seen in Figs. 2 through 7, Fig. 3 showing the complete fixture, a cylindrical main housing 17 of the movable part of the assembly fixture has 8 welding electrode receiving apertures 21, two diametrically opposed guide slots 19 at one end thereof, bayonet latching slots 22 at the opposite end, an annular shoulder 23 for one side of a locking ring 24 and two opposed pins 25 on the other side of the ring for holding it in position on the housing.

Internally, the one end of housing 17 has a smooth cylindrical surface in which a sleeve 26, having slots 50 corresponding to apertures 21 in the housing, is adjustably positioned. The slots 50 are held in alignment with apertures 21 and the sleeve 26 is prevented from falling out of the housing 17 by the pins 25 which extend through the housing and are positioned in slots 49 in the sleeve. The sleeve 26 may be locked in any adjusted position by turning ring 24, camming surfaces 28 being provided thereon to force pins 29, which are slidably located in holes in the housing 17, into friction contact with the sleeve.

The other internal end of the housing 17 is threaded to receive an externally threaded end member 30 which is adjusted to contact and move a tubular, retaining ring support element 31 into the housing. Extensions 32 on tubular element 31 slide in slots 19 in the housing to keep the element from turning while the element is being moved in the housing. Pins 34 in the end member 30 ride in an annular groove 33 at the end of the tubular element 31 to hold the parts together. The leverage provided by the extensions of the pins 34 facilitates tightening the end member on the housing 17.

The bulb 11 of the tube containing the grid assembly, spring 8 and retaining ring 12, is placed in the sleeve 26 of the fixture and the end member 30 is screwed on to the housing 17 as shown in Fig. 4. In this position the retaining ring 12 is supported against the end of element 31 and the end of sleeve 26 bears against the flange 43 of the bulb 11.

To compress the spring 8 to the prescribed tension, the movable part of the fixture is placed on and locked to the top of frame 45 of tensioning device 37 as seen in Figs. 3 and 4 by means of the bayonet connection slots 22 in the housing 17 and the pins 35 extending inwardly from the collar 36 on the frame. An eccentric 38 is then turned by crank 39 mounted on the frame 45 to force an indicator 40 to move up on vertical rods 41 therefor, moving actuator element 42 for the indicator into contact with the sleeve 26 in the housing 17. The sleeve bears on the bulb flange 43 and moves the bulb up over the retaining ring 12 until the spring 8 has been compressed by the required amount as shown on the indicator 40. To hold the indicator in this adjusted position, thumb screws 44 on the frame 45 are tightened to lock the indicator on the rods 41. The ring 24 on the housing 17 is then turned to lock the sleeve 26 to the housing. The upper movable part of the fixture is then disconnected at the bayonet joint and transferred to a conventional welder provided with modified electrodes as seen in Fig. 7. To weld the ring 12 to the bulb 11, the electrode 46 is successively inserted into the apertures 21 in the housing to cooperate with electrode 47 which is inserted in the opening of end member 30, the inner electrode 47 being conveniently located within the housing by the stop 48 thereon.

It is to be understood that the above described embodiment is simply illustrative of the application of the principles of the invention. Numerous other arrangements may be readily devised by those skilled in the

art which will embody the principles of the invention and fall within the spirit and scope thereof.

What is claimed is:

1. A pressure setting fixture for a resiliently supported assembly comprising a frame, a device movably attached to the frame for holding a multi-part assembly, means mounted on the frame for applying a predetermined force to an assembly in the device to position the parts of the assembly and means on the device for locking the assembly in position, said device having apertures for admitting welding electrodes for welding the assembled parts together.

2. A pressure setting fixture for a resiliently supported assembly comprising a main housing having receiving means for holding a multi-part assembly therein, a parts contacting sleeve movably mounted in the housing, means attachable to the housing for applying a pre-determined force to the sleeve to position the parts of the assembly and means on the housing for locking the sleeve in position.

3. A pressure setting fixture for a resiliently supported assembly comprising a main housing having receiving means for holding a multi-part assembly therein, a parts contacting sleeve movably mounted in the housing, means attachable to the housing for applying a pre-determined force to the sleeve to position the parts of the assembly, means movably mounted in the housing for making friction contact with the sleeve, and camming means on the housing for actuating the friction means to lock the sleeve in position.

4. A pressure setting fixture for a resiliently supported assembly comprising a hollow, cylindrical main housing for receiving a cylindrical multi-part assembly and having a removable parts support member mounted on one end thereof, a parts contacting sleeve movably mounted in the housing, means attachable to the housing for applying a pre-determined force to the sleeve to position the parts of the assembly against the support therefor, means movably mounted in the housing for making friction contact with the sleeve and camming means on the housing for actuating the friction means to lock the sleeve in position.

5. A pressure setting fixture for a resiliently supported assembly comprising a frame, a device movably attached to the frame for holding a multi-part assembly, a pressure indicator adjustably positioned on the frame, means for moving the indicator on the frame for applying a pre-determined force to an assembly in the device to position the parts of the assembly, means on the frame for locking the pressure indicator in position thereon and means on the device for locking the assembly in position.

6. A pressure setting fixture for a resiliently supported assembly comprising a hollow, cylindrical main housing for receiving a multi-part assembly and having a removable parts support member mounted to one end thereof, a parts contacting sleeve movably mounted in the housing, a frame attachable to the housing, a pressure indicator adjustably positioned on the frame, means for moving the indicator on the frame for applying a pre-determined force to the sleeve to position the parts of the assembly against the support therefor, means on the frame for locking the pressure indicator in position thereon, means movably mounted in the housing for making friction contact with the sleeve, and camming means on the housing for actuating the friction means to lock the sleeve in position, said housing and sleeve having corresponding apertures for admitting welding electrodes for welding the assembled parts together.

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