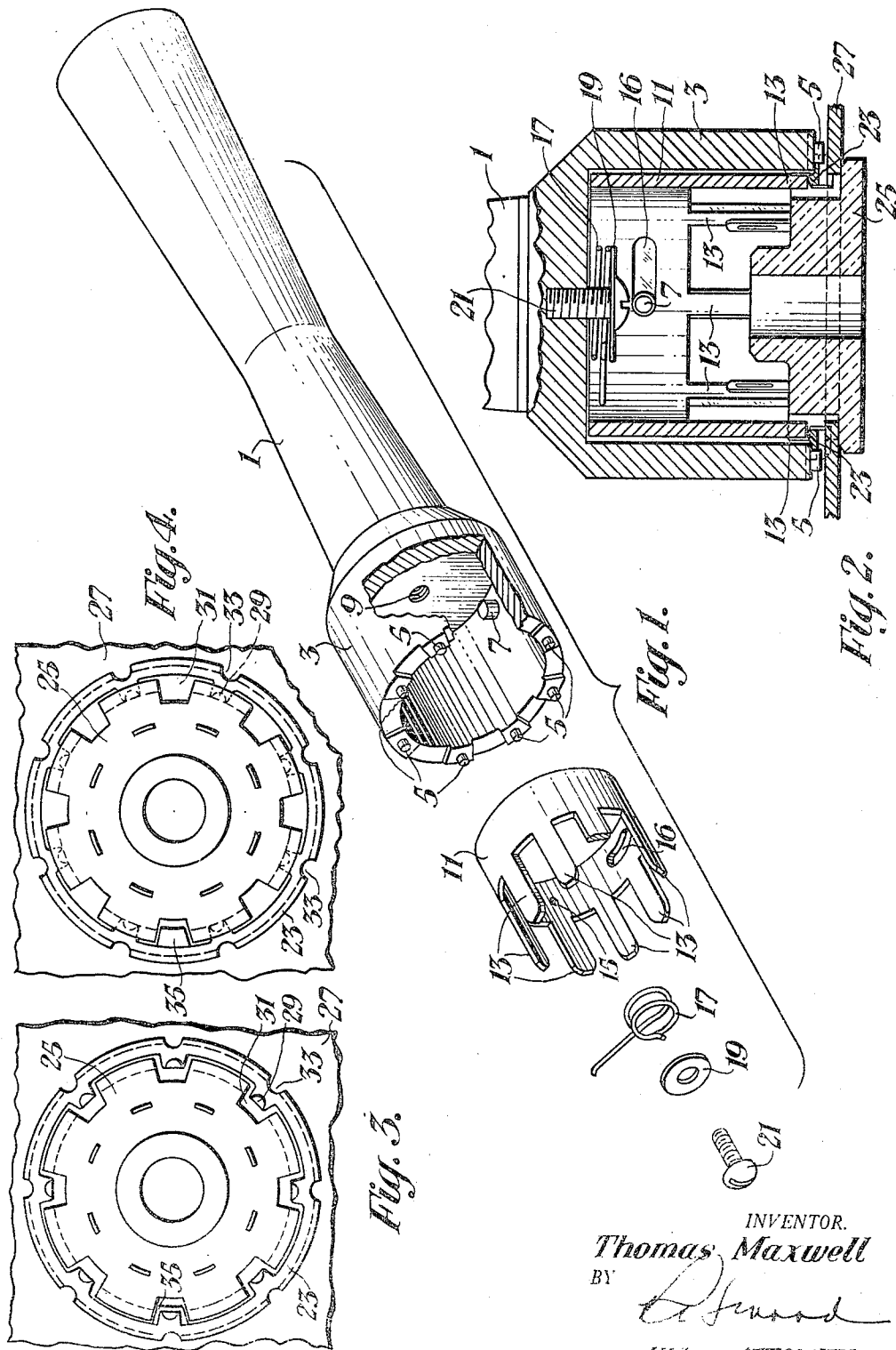


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SOCKET ASSEMBLY TOOL
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SOCKET ASSEMBLY TOOL

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My invention relates to socket assembly tools, and particularly to tools for assembling vacuum tube sockets in a chassis.

Certain types of vacuum tube sockets, particularly the well-known "loctal" type, comprise a socket body having receptacles and contacts for receiving and making contact with the base pins of vacuum tubes, and a retaining ring adapted to engage the socket body and hold the socket body in the hole provided in the chassis or mounting plate. The retaining ring is provided with inwardly extending lugs which engage locking projections on the body of the tube socket after rotation of the ring through a small arc. In order to firmly hold the socket body to the chassis, the retaining ring is provided with spring surfaces, so that when in place the retaining ring exerts sufficient pressure on the body of the socket to prevent the ring from being dislodged and also holds the socket firmly in place.

In assembling this type of socket it is necessary to insert the body of the socket through the hole provided for it in the chassis, or mounting plate, following which the retaining ring is placed in position, and sufficient pressure is applied so that the ring may be turned until the inwardly projecting lugs are centered with respect to the locking projections of the socket body after which the pressure is relieved, so that the spring action of the ring may securely clamp the socket body to the chassis.

It has previously been proposed to provide tools for this purpose which are constructed and arranged so that the retaining ring may be compressed and turned by the tool to any desired degree. However, in previous tools of this type, the amount of rotation has been judged by eye, with the result that the retaining ring is not always rotated a sufficient amount to center its inwardly projecting lugs with the locking projections on the body of the socket, which results in unequal pressure distribution, and a possibility of the socket body being jarred loose.

Accordingly, it is an object of my invention to provide an improved tool of the type described which automatically positions the retaining ring so that its projections are centered in the locking projections of the socket body to thereby secure maximum pressure distribution.

Another object of my invention is to provide a tool of the type described which is constructed and arranged so that the socket body and the retaining ring are automatically aligned for the proper rotation of the retaining ring to the locking position.

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Another object of my invention is to provide a tool of the type described which is arranged to permit the use of non-skilled help, since the tool functions automatically, and does not require any judgment upon the part of the operator.

Another object of my invention is to provide a tool of the type described which can be used for either assembling or removing the retaining ring, and is arranged to automatically position itself correctly for either operation.

A further object of my invention is to provide an improved socket assembly tool.

Other objects of my invention and features of novelty thereof will be apparent from the following description taken in connection with the accompanying drawings.

In practicing my invention, I provide an outer shell of suitable material having a handle attached thereto, this outer shell being of sufficient diameter to encircle the socket. Equally spaced axially extending pins are arranged around the shell at the end opposite the handle, and are so spaced as to engage notches in the retaining ring. An inner shell is secured within the outer shell, and is provided with axially extending fingers around the periphery which are arranged to engage splines spaced around the socket body. The inner shell is limited in its amount of movement by suitable stop means, and is retained in its normal position by a suitable form of biasing spring. When the inner shell is in its normal position, the fingers of the inner shell are aligned with the pins disposed around the edge of the outer shell, and when the inner shell has been rotated through its full amount of rotation, the fingers of the inner shell are at a point midway between the pins of the outer shell.

The notches in the retaining ring which are engaged by the pins of the outer shell are in radial alignment with the inwardly extending projections on the retaining ring, so that when the retaining ring is rotated to a position in which the inwardly extending lugs of the retaining ring are equidistant between the splines in the socket body, the notches in the periphery of the retaining ring will also be equidistant between the splines in the socket body.

I shall describe one form of socket assembly tool embodying my invention, and shall then point out the novel features thereof in claims.

In the drawings:

Fig. 1 is an exploded view of the socket assembly tool,

Fig. 2 is a cross sectional view of the socket

assembly tool in position for assembling the retaining ring to the socket body.

Fig. 3 is a plan view showing the socket body and retaining ring before the socket assembly tool has been applied, and

Fig. 4 is a plan view showing the socket body and retaining ring after the socket assembly tool has been applied to position the retaining ring in its locking position.

Similar reference characters refer to similar parts in each of the several views.

Referring to Fig. 1, the handle 1 is shown attached by suitable means to the rear of the outer shell 3 of the tool, which has the locating pins 5 equally spaced around its periphery at the front or open end of the shell. The outer shell 3 of the tool is preferably made of metal, and the handle 1 may be made either of metal or of other suitable material securely fastened to the shell by appropriate means such as a splined shank. The outer shell is also provided with a stop pin 7, and a hole 9, which is drilled and tapped to receive the assembling screw.

The inner shell 11 is arranged and proportioned to fit closely within the outer shell 3, and is provided with the axially extending fingers 13, which are of sufficient length so that when the inner shell is in its proper position within the outer shell, the fingers 13 extend almost to the edge of the outer shell. A hole 15 is drilled in the inner shell to receive one end of the retaining spring, and a slot 16 is provided to receive the stop pin 7 which is rigidly fixed in the outer shell.

The inner shell is retained within the outer shell by means of the spring 17, the washer 19 and the screw 21, and the parts are so arranged that when the tool is assembled the inner shell 11 will be free to rotate within the outer shell within the limits provided by the stop pin 7 and the contacting slot 16, but the inner shell is restrained in its axial movement by the cooperation of the retaining spring 17 and the washer 19, and the stop pin 7 and slot 16.

When the tool is assembled, the parts are so arranged that the fingers 13 are in radial alignment with the pins 5 of the outer shell, and when the inner shell 11 is rotated through its entire amount of travel, the fingers 13 will be equidistant between the pins 5 of the outer shell. The biasing spring 17 is arranged and assembled so that normally the fingers 13 of the inner shell 11 are in radial alignment with the pins 5 of the outer shell 3, and when the inner shell 11 is rotated to its extreme position, the biasing spring 17 is deflected, so that when the pressure is removed from the inner shell 11, the spring 17 returns the inner shell 11 to its normal position.

Referring to Fig. 2, there is shown a cross section of the tool in position to apply the retaining ring to the socket. The inwardly projecting lugs of the retaining ring 23 are shown engaged in an annular groove cut around the periphery of the socket body 25, which is in position in the chassis 27. The fingers 13 of the inner shell 11 are shown engaged in splines cut in the body of the socket, and the pins 5 of the outer shell 3 are shown engaged in the notches of the retaining ring 23.

Fig. 3 is a plan view showing the socket body, the chassis and the retaining ring in position before the retaining ring is moved to its locking position. As shown, the retaining ring 23 encircles the socket body 25, and is placed so that the inwardly projecting lugs 29 are in alignment with the vertical splines 31 of the socket body, and as previously stated the notches 33 in the outer

periphery of the retaining ring are shown as being oppositely disposed to the inwardly projecting notches 29.

With the socket body and the retaining ring placed in position shown in Fig. 3, the assembly tool is applied, and the fingers 13 of the inner shell 11 engage the vertical splines 31 in the socket body, while the pins 5 of the outer shell 3 engage the notches in the retaining ring 23. By then exerting a slight downward pressure in order to overcome the spring effect of the retaining ring 23, and rotating the tool in the proper direction, the retaining ring 23 is rotated with respect to the socket body 25, and the inwardly projecting lugs 29 of the retaining ring are moved into an engagement with the groove in the socket body 25 extending between the vertical splines 31. This movement as previously stated is limited to a predetermined amount by the stop pin 7 engaging the slot 16, so that the lugs of the retaining ring 23 are moved into a position half-way between the vertical splines 31.

When the assembly tool is removed after rotation of the retaining ring, the ring and socket body are then in the position shown in Fig. 4. As shown, the inwardly projecting lugs 29 are equidistant from the vertical splines 31. This results in a maximum and uniform distribution of the spring pressure of the retaining ring which holds the socket body in place, and also insures that the maximum displacement of the retaining ring with respect to the socket body will be necessary to disengage the retaining ring from the socket. Since this spacing operation is performed automatically by the assembly tool, it requires no judgement on the part of the operator to determine whether or not the retaining ring is correctly positioned. Accordingly, the process of assembling the sockets is speeded up, and non-skilled help may be employed in this assembly operation, since no judgement on the part of the operator is required.

It will be obvious that the tool may be equally well used for disassembling the sockets, the operation being the reverse of that for assembling the sockets. That is, the tool is placed in position, so that the fingers 13 on the inner shell 11 engage the vertical splines 31 of the socket body, and the tool is then rotated until the pins 5 of the outer shell engage the notches 33 of the retaining ring 23. The tool is then rotated in the opposite direction to the limit of its movement as determined by the stop pin 7 and the slot 16, at which time the retaining ring will have the inwardly projecting lugs 29 disengaged from the socket body, so that the retaining ring may be removed and the socket body removed from the chassis.

The socket body 25 is prevented from turning by a lug 35 projecting inwardly in the hole provided for the socket body in the chassis 27. This inwardly projecting lug serves to position the socket body in the correct position, and also prevents the turning of the socket body 25 during and after the assembly operation.

From the foregoing, it will be seen that my invention provides a simple and accurate means for assembling tube sockets of the type described, and has the advantages of simplicity of construction and operation, permitting the use of non-skilled help in assembling such sockets.

Although I have herein shown and described only one form of my invention, it is to be understood that various changes and modifications may be made therein within the scope of the appended

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claims without departing from the spirit and scope of my invention.

Having thus described my invention, what I claim is:

1. A socket assembly tool comprising: An outer shell having a handle attached thereto and provided with equally spaced pins projecting in an axial direction from the periphery of said shell, an inner shell adapted to be disposed in said outer shell, said inner shell having equally spaced fingers extending axially from one end of said inner shell, retaining means for retaining said inner shell within the outer shell and constraining it from axial movement with respect to said outer shell but permitting rotary movement with respect to said outer shell, means for positioning said inner shell so that the fingers thereof are in radial alignment with the pins of said outer shell, and means for limiting the rotation of said inner shell to a position in which the fingers of said inner shell are equidistant between the pins of said outer shell.

2. A tool for assembling sockets of the type having a socket body provided with axially extending splines and an annular groove, and a retaining ring having inwardly extending lugs which engage the body of the socket in said annular groove between said splines, said tool comprising an outer shell adapted to engage said retaining ring, an inner shell disposed within said outer shell and adapted to engage the splines of said socket body, means for retaining said inner shell in said outer shell but permitting rotation of said inner shell with respect to said outer shell, and means for limiting the relative rotation of said inner shell so that said retaining ring is rotated to a position in which said lugs are equidistantly spaced between said splines.

3. A socket assembly tool comprising an outer shell having a handle at one end, the other end of said outer shell being provided with a plurality of equally spaced pins extending axially from the end of the shell, an inner shell having a plurality of equally spaced fingers extending axially from said inner shell, means for retain-

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ing said inner shell within said outer shell, said retaining means permitting rotational movement of said inner shell with respect to said outer shell but limiting the axial movement of said inner shell with respect to said outer shell, biasing means for causing said inner shell to assume a normal position wherein said fingers are radially aligned with the pins of said outer socket shell, and means for limiting the rotation of said inner shell from its normal position to a position wherein said fingers are equidistantly spaced between the pins of said outer shell.

4. A socket assembly tool comprising an outer shell having a handle at one end and provided with a plurality of axially extending pins equally spaced around the other end of the shell, an inner shell arranged to be disposed within said outer shell and provided with a plurality of axially extending fingers equally spaced around the outer end of said inner shell, means for retaining said inner shell within said outer shell and permitting rotary movement but not axial movement of said inner shell, a stop pin securely attached to said outer shell and projecting inwardly from the inner wall of said outer shell, a slot in said inner shell for said stop pin, said slot being arranged and proportioned so that said inner shell is constrained in its rotary movement between a first position in which said fingers are radially aligned with said pins, and a second position in which said fingers are spaced equidistantly from said pins, and spring means for biasing said inner shell to one of said first or said second positions.

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