June 20, 1933. F. REUTTER 1,914,650

PROCESS OF MAKING PIN TYPE CONTACT MEMBERS

Filed Jan. 17, 1931

Fig. 1.

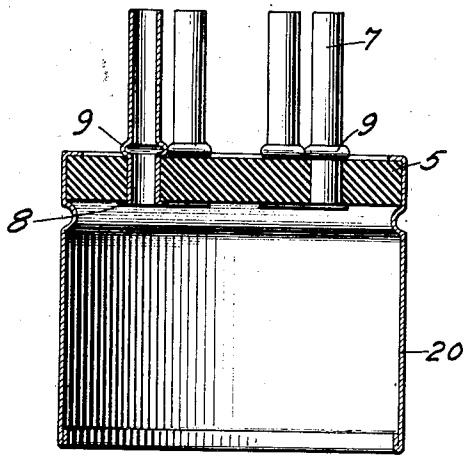


Fig. 2.

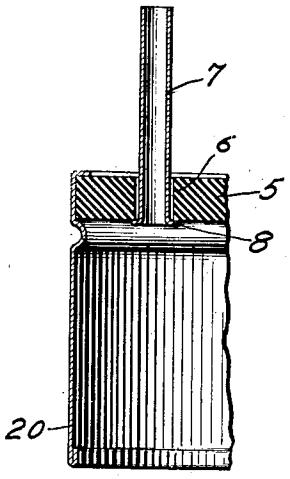


Fig. 3.

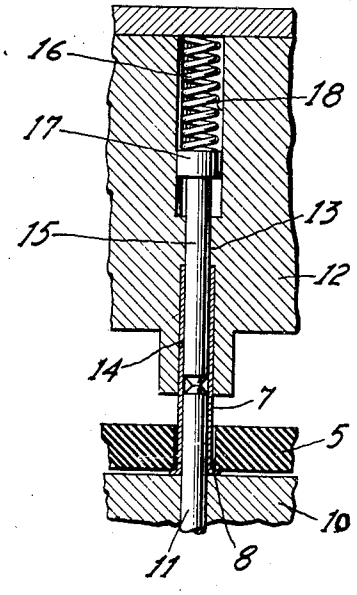
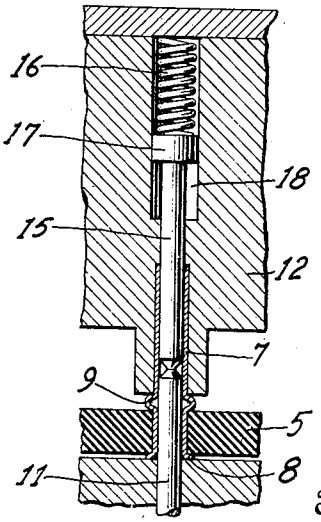


Fig. 4.



Inventor

Frederick Reutter

By his Attorneys

Emery Booth Varney & Whittemore

Patented June 20, 1933 1,914,650

UNITED STATES PATENT OFFICE

FREDERICK REUTTER, OF WATERBURY, CONNECTICUT, ASSIGNOR TO SCOVILL MANUFACTURING COMPANY, OF WATERBURY, CONNECTICUT, A CORPORATION OF CONNECTICUT

PROCESS OF MAKING PIN TYPE CONTACT MEMBERS

Application filed January 17, 1931. Serial No. 509,291.

This invention relates to pin type contact members such as are employed, for example, in radio tube bases and other electrical devices having plug-in connections.

Devices of this type include a base member or a disc of insulating material, such as porcelain, bakelite, glass, or some similar substance, having a number of holes extending therethrough for receiving the usual contact pins. In one well-known way of making such devices, each hollow pin is provided with an outer shoulder spaced somewhat from one end of the pin with the surface between the shoulder and adjacent end knurled or otherwise roughened to hold the pins against turning when such end is positioned in a pin receiving hole in the base. After being pushed into place, the end of the pin is spun over to engage the side of the base opposite to that engaged by the shoulder so as to hold the pins in the openings. Bases made in this way have not been entirely satisfactory. The holes in the base members vary considerably in size so that the pins are frequently loose, while the discs themselves vary in thickness to such an extent that tools cannot fully compensate for the different sizes. At the same time, the individual pins in a finished base frequently extend outwardly for varying distances.

An object of this invention is to provide a method of making contact bases, of such character that the pins are rigidly secured in place and extend outwardly from the base member a predetermined amount irrespective of variations in the size of the opening or the original length of the pin.

This and other objects which will be apparent to those skilled in this particular art are accomplished by means of the invention illustrated in the accompanying drawing in which,

Fig. 1 is a sectional view of one type of a finished article employing a contact base which has been made by the present method.

Fig. 2 is a similar view showing the first step in the manufacture by means of the present invention of the base shown in Fig. 1.

Figs. 3 and 4 are partial sectional views of an apparatus especially adapted for securing pins in tube bases in accordance with my improved method, showing successive operations thereof.

In making contact members in accordance with the present invention, a base member or disc 5 of any suitable insulating material having the desired number of pin receiving holes 6 is provided. Each contact pin 7 is hollow and is originally formed of a diameter which permits it to be positioned freely in an associated hole, a flange 8 being formed on the inner end to engage the inner face of the base member 5. Each pin 7 is of such length when first positioned in the base as to extend outwardly from the base a greater distance than is desired in the finished product. In other words, each pin is provided with an excess of metal to permit a subsequent forging operation which expands that portion lying within the opening 6 so as to force it outwardly into binding engagement with the wall of the opening. This forging operation simultaneously shortens the pin to the point where it extends the desired distance beyond the base member 5. The excess metal in the pin is employed in the forging operation to form a bead or collar 9 which engages the base member 5 on the side opposite from the flange or collar 8 and which co-operates in rigidly securing the pin in place.

One form of apparatus for carrying out the present invention is illustrated in Figs. 3 and 4 and consists of a supporting bed 10 on which the disc or base member 5 with the freely assembled pins 7 is positioned, a pin supporting mandrel 11 being securely positioned in the bed so as to extend into the interior of each hollow pin 7. A co-operating plunger 12 having a bore 13 which is enlarged at its lower end to form a recess 14 for receiving the upper portion of the pin 7 is provided with a co-operating mandrel 15 which is slidably mounted in the bore 13 and which extends downwardly through the recess 14, so as to enter and support the interior of the pin 7 during the forging operation. The mandrel 15 is movable relatively to the plunger 12 and is normally forced downwardly by a suitable spring 16 engag-

ing the mandrel head 17 located in a spring chamber 18.

The operation of the apparatus and the carrying out of the method will be apparent from Figs. 3 and 4. The pin 7 is originally formed of such length that when positioned in the base member 5 it projects outwardly therefrom a greater distance than is desired in the finished article. The base member is supported on the bed 10 and the stationary mandrel 11 projects upwardly into the pin 7. The plunger 12 is lowered and the outer portion of the pin 7 is received in the recess 14 between the wall thereof and the movable mandrel 15. It will be apparent that downward movement of the plunger 12 forges the metal of the pin 7 that is within the opening 6 to expand outwardly and engage the wall of the opening with a firm grip. Downward movement of the plunger 12 is continued until the outer end of the pin 7 is positioned exactly the right distance away from the disc 5. The flow of excess metal occasioned by this continued movement provides a bead 9 which engages the outer face of the base member 5 and assists in rigidly securing the pin 7 in place. The inner wall of the pin is supported by the co-operating mandrels 11 and 15, the latter being forced upwardly into the plunger by the stationary mandrel 11 as the plunger moves down.

It will be apparent that manufacturing inaccuracies, both in the dimensions of the original hollow pin 7 and in the size of openings 6 in the base member, are automatically compensated for when the pins are secured in place by means of the present invention. If a greater expansion of the pin 7 to engage the wall of the opening 6 than is shown in the drawing is required, then the bead 9 will be slightly smaller, and vice versa. At the same time, absolutely equal projection of all pins 7 from a given base member or disc 5 is assured, irrespective of manufacturing inaccuracies or slight differences in length of the original pins 7, as the extent of projection is positively determined by the position of the plunger 12 at the finish of its downward stroke. Differences of length of the different original pins will merely cause slight differences in the sizes of the beads 9 in the finished article. It will, of course, be understood that the plunger 12 has a sufficient number of recesses 14 and associated mandrels 15 to simultaneously forge all pins in a given base.

Fig. 1 shows one form of finished article in which the side wall 20 has been mounted on the base member or disc 5 in the usual way to provide a tube base. However, it will be apparent that the present invention is applicable to all other forms of contact members of the plug-in type as well as the particular form illustrated.

I claim as my invention:—

1. The process of securing the end of a hollow contact pin of indeterminate length and having a flange at one end in the opening of a supporting base member so that said pin projects beyond one side of said member a predetermined distance, which consists in positioning the flanged end of said pin in an opening in said base member with said flange engaging one side of said member and with the other end projecting beyond said member a greater distance than desired, and forging said pin about a mandrel so as to simultaneously shorten the projected portion to the predetermined distance and to expand that portion of said pin within said opening into binding engagement with the wall thereof, and causing the excess metal to form a bead around said pin to engage said member on the side thereof opposite said flange.

2. The process of securing a plurality of hollow contact pins of different lengths in the perforations of a supporting base member so that each of said pins projects beyond said member a predetermined and equal distance, each pin having a flange at one end, which consists in positioning the flanged ends of said pins in the perforations in said member with the flanges of all pins engaging the same side of said member and the unflanged ends of said pins projecting beyond said member a greater distance than desired, and simultaneously forging said pins so as to shorten the projecting portions thereof to the desired and an equal extent and to expand those portions of said pins within said openings into binding engagement with the walls thereof, and causing the excess metal in said pins to form beads to engage said member on the side opposite from said flanges.

In testimony whereof, I have signed my name to this specification this 15th day of January, 1931.

FREDERICK REUTTER.