June 20, 1933. F. REUTTER 1,914,651

PIN TYPE CONTACT MEMBERS

Original Filed Jan. 17, 1931

Fig. 1.

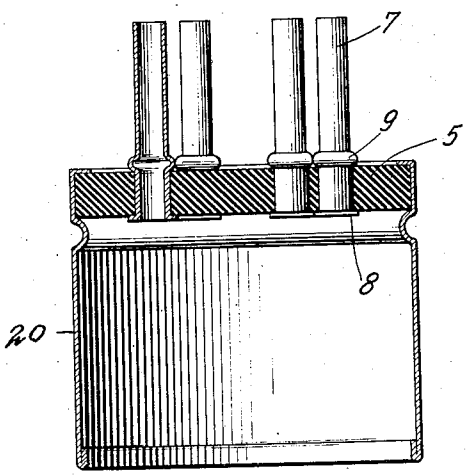


Fig. 2.

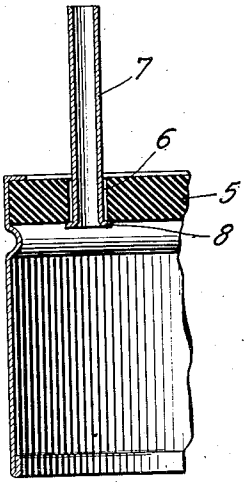


Fig. 3.

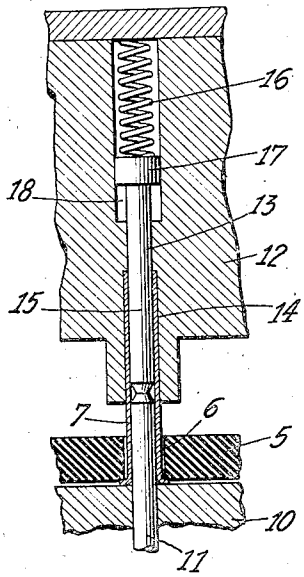
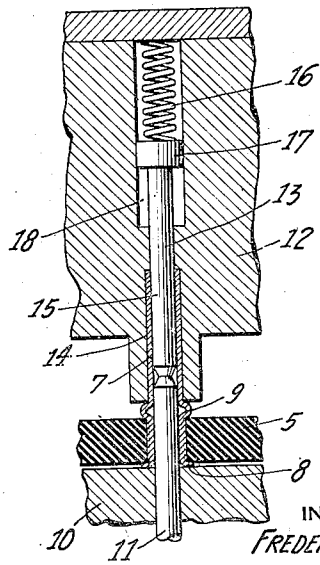


Fig. 4.



INVENTOR
FREDERICK REUTTER.

BY

Avery, Booth, Davis & Williams

ATTORNEYS.

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UNITED STATES PATENT OFFICE

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

PIN TYPE CONTACT MEMBER

Original application filed January 17, 1931, Serial No. 509,291. Divided and this application filed March 5, 1932. Serial No. 597,026.

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, and this application is a division of my co-pending application Serial Number 509,291, filed January 17, 1931.

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 pin in the opening. Contact members 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 contact base of the type set forth constructed and arranged so that the pins are rigidly associated with the base member and extend outwardly from the base member a predetermined and equal amount irrespective of manufacturing inaccuracies in the size of the openings or in the original lengths of the pins.

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 is which,

Fig. 1 is a sectional view of one type of finished article employing a contact base embodying the present invention.

Fig. 2 is a similar view of part of the base shown in Fig. 1, during its manufacture.

Figs. 3 and 4 are partial sectional views of an apparatus especially adapted for securing pins in bases in accordance with the present invention, showing successive operations thereof.

In making the contact members of 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 manufacturing the contact base of 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 forg-

ing operation. The mandrel 15 is movable relatively to the plunger 12 and is normally forced downwardly by a suitable spring 16 engaging the mandrel head 17 located in a spring chamber 18.

Each pan 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, and produces a thickening of the pin wall within the opening to provide a rugged construction, the degree of thickening being determined by the space between the mandrel 11 and the wall of opening 6. 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 in the manner described. 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:

1. The combination in a contact member of a base, a contact pin extending through and beyond an opening in said base and projecting beyond one side of said base a predetermined extent and having that portion of its length which is located within said opening of greater thickness than the projecting portion and engaging the wall of said opening with a binding grip.

2. The combination in a contact member of a base, a contact pin extending through and beyond an opening in said base and projecting beyond one side of said base a predetermined extent and having that portion of its length which is located within said opening of greater thickness than the projecting portion and engaging the wall of said opening with a binding grip, and base-engaging flanges at each end of said thickened portion.

In testimony whereof, I have signed my name to this specification this third day of March, 1932.

FREDERICK REUTTER.