Oct. 13, 1942. F. L. CREAGER 2,298,858

CONTROL ELEMENT

Filed May 1, 1940

Fig. 1.

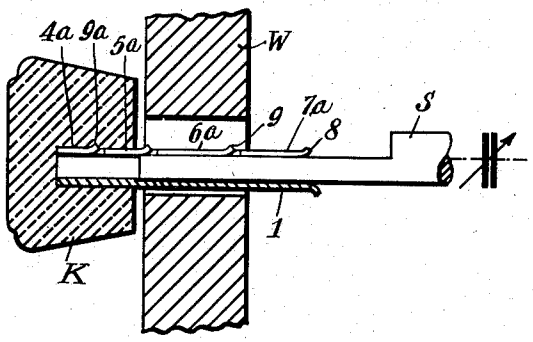


Fig. 2.

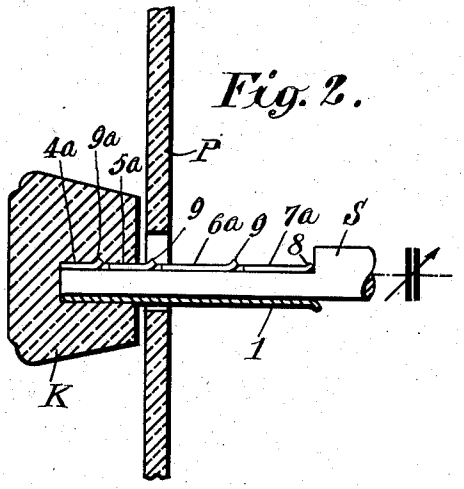


Fig. 3.

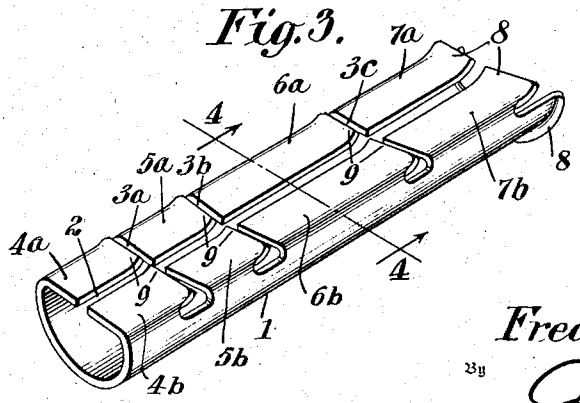
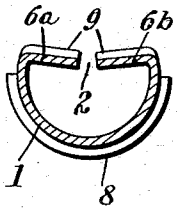


Fig. 4.



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2,298,858

CONTROL ELEMENT

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Application May 1, 1940, Serial No. 332,771

7 Claims. (Cl. 287—53)

This invention relates to knobs, dials, switch handles and the like and has special reference to the provision of improvements in means for attaching a control element of this general type to a shaft which is to be turned thereby.

While in the discussion of the problem and in the following description of a preferred embodiment of the invention, reference will be made to a knob for a tuning shaft of a radio receiver, it is to be understood that the disclosure in this respect is merely illustrative for purposes of explaining the inventive concept, and that the invention is readily applicable to control elements of other types and for other classes of apparatus.

In the drawing:

Figures 1 and 2 are side views partly in section showing knobs and the attaching means of the present invention affixed to shafts of similar length but in front of panels of different thicknesses;

Figure 3 is an enlarged view in perspective of a preferred form of the knob attaching means of the present invention; and

Figure 4 is a sectional view taken on the line 4—4 of Fig. 3.

It is appreciated by those engaged in the merchandising of radio apparatus that to meet the tastes of the public, broadcast receiving sets must be offered in a number of different cabinet materials and styles. That is to say, of several prospective purchasers confronted by several receivers having identical electrical characteristics, one may prefer a cabinet made of a polished wood, another may prefer a "modernistic" design in a molded plastic cabinet, still another may demand a painted metal cabinet. Because of the different mechanical strength of these several cabinet materials the control panels are usually of different thicknesses. Thus, a metal panel may be made very thin; another formed, for example, of wood, may necessarily have to be several times thicker than the metal one, while usually a panel formed of a molded plastic material such as "Bakelite" may be of some intermediate thickness.

This has heretofore prevented the manufacturers of radio receivers from adopting a single standard length for each type of control shaft with which the various sets are equipped, because if two shafts of the same length should be installed, respectively, in a thick wooden cabinet and in a thinner molded plastic cabinet, then the shaft ends and their knobs, will project different distances from the front surfaces of the control panels.

In the above connection, it may be said that the inability of the manufacturer to adopt his knobs and knob attaching means to shafts having different effective clamping areas is especially serious in the event that he has on hand a great many completed radio chassis and is confronted with a change in the public demand for the cabinet to which the shafts of said chassis are adapted. Thus, should the demand swing from wooden cabinets to molded plastic cabinets, he would, prior to this invention, have to saw off the excess length of each shaft in order to adapt the knobs for the said shafts to the thinner control panels of the molded plastic cabinets. To remove a piece from a delicately balanced condenser shaft without damage to the set is not as simple an operation as might at first glance appear.

Accordingly, considered from a broad aspect, the principal object of the present invention is to effect economies through the standardization of shaft dimensions in the manufacture of radio sets and other apparatus incorporating control knobs, dials, switch handles, or the like.

A more specific object of the present invention is to provide a knob or the like for attachment to a shaft-end adjacent a control panel, said knob incorporating a coupling element which maintains the knob in a desired position with respect to said control panel substantially irrespective of the exact area of the shaft which is available for coupling purposes.

Another and related object of the invention is to provide a simple and inexpensive coupling member of the character described which is substantially immune to side play and wobble, and which at the same time, may be readily attached, without the use of tools, to a shaft end as by a simple thrust movement.

The foregoing and other objects are achieved in accordance with the present invention by the provision of a knob or the like having a cavity and a sleeve seated within and projecting from said cavity and means comprising the projecting portion of said sleeve for exerting a clamping force upon the shaft over a variable area determined by the distance said shaft is entered within said sleeve.

In Figs. 1 to 4, inclusive (wherein like reference characters represent the same or corresponding parts) 1 designates generally a sleeve which is preferably D-shaped in cross section, to prevent relative rotary movement between it and the flattened end of the shaft S to which it is applied, and is preferably constituted of tempered spring metal. The plane surface of the D is pro-

vided with an axially extending slit 2 and a plurality of transversely extending slits 3a, 3b, 3c, which divide the said surface into a plurality of oppositely located pairs of inwardly directed tongues 4a, 4b, 5a, 5b, etc., each of which is adapted to exert a discrete clamping force to the shaft S at spaced areas along the surface thereof.

The unsprung inside diameter of the sleeve 1 is preferably slightly less than that of the shaft S which it is designed to accommodate. It is accordingly preferable to provide the leading edges of the sleeve with a flare 8 to facilitate entry of the shaft end. It is also preferable to provide the leading transverse edges of the other discrete tongues with outwardly turned flares 9 which will slide over the terminal of the shaft as the sleeve is pressed thereon. In order to augment the clamping or coupling force applied to the shaft by the several tongues on the sleeve, it is preferable to "toe in" the axial edges of the tongues throughout that portion of their length which lies behind the rear surfaces of their flares 9, as indicated in Fig. 4.

It is, of course, practical to make the knob K integral with sleeve 1 as by molding it thereon. This, however, is not necessary and it is preferable to form the knobs each with a cavity of a diameter calculated to receive the end of the sleeve by means of a force fit. In this case after the end of the sleeve has been urged into the knob cavity the compression force exerted upon the flared edges of the tongues which are within the cavity is converted to a biasing force which urges the flared edges against the inner surfaces of the cavity. Since the edges or the corners of the flare or flares 9a (Figs. 1 and 2) within the cavity may be relatively sharp, any force tending to pull the sleeve out of the knob cavity will cause these edges and corners to bite into the knob material and anchor the sleeve more firmly therein.

The length of the sleeve S, as measured from its leading edge to the base of the knob K to which it is affixed should, for maximum utility, be long enough, and its clamping force great enough, to maintain said knob against displacement upon the shaft-end when, as shown in Fig. 1, only the projecting portion of the sleeve receives said shaft end. With this preferred requirement in mind, it will be apparent that the sleeve may be made as long as required to affix it to a shaft which terminates adjacent the rear of the control panel. It will also be apparent that the sleeve may be provided with any desired number of tongues. These tongues may be struck out on the flat plate from which the sleeve is formed and subsequently provided with their flared and toed-in edges by a simple bending operation.

Other modifications of the invention will suggest themselves to those skilled in the art. It is to be understood, therefore, that the foregoing description of a preferred embodiment of the invention should be interpreted as illustrative and not in a limiting sense except as required by the prior art and by the spirit of the appended claims.

What is claimed is:

1. A knob having a sleeve projecting from the base thereof and adapted to receive a shaft end, said sleeve comprising a plurality of discrete pairs of clamping elements constituted of spring material terminating adjacent the axis of said shaft and adapted to exert a clamping force upon said shaft at spaced areas along the surface thereof.

2. The invention as set forth in claim 1 and wherein each of said discrete pairs of clamping members comprise a plurality of axially directed, oppositely located, tongues struck out from the body of said sleeve.

3. A knob having a sleeve projecting from the base thereof and adapted to receive a shaft end, said sleeve comprising a plurality of pairs of tongues constituted of spring material directed inwardly from opposite sides of the longitudinal axis of said shaft, the unsprung inside diameter of the greater part of the projecting portion of said sleeve being less than that of said shaft end.

4. The invention as set forth in claim 3 and wherein the leading transverse edges of the tongues on the projecting portion of said sleeve are flared outwardly to facilitate the admittance of the shaft end within said sleeve.

5. The invention as set forth in claim 3 and wherein certain of said tongues are within the knob and the leading transverse edges of the tongues on the knob-enclosed portion of said sleeve are flared outwardly and are biased to engage the surrounding surface of said knob.

6. A knob having a cavity and a sleeve for a shaft seated within and projecting from said cavity, and means comprising the projecting portion of said sleeve for exerting a clamping force upon said shaft at a plurality of axially spaced points over a variable area determined by the distance said shaft is entered within said sleeve.

7. The invention as set forth in claim 6 and wherein said sleeve is constituted of spring metal and is provided on its free end with a flare to facilitate the entry of the shaft end therein.

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