March 22, 1938. S. H. WATSON, JR 2,111,713

OUTLET

Filed Jan. 30, 1937

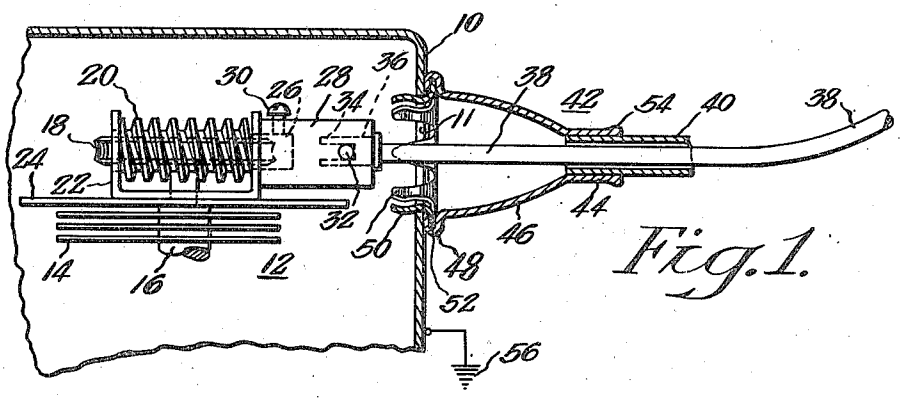

Fig. 1.

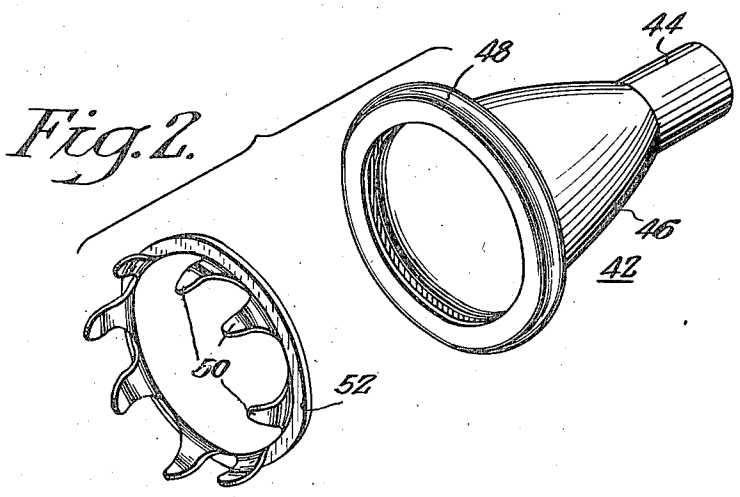

Fig. 2.

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Patented Mar. 22, 1938 2,111,713

UNITED STATES PATENT OFFICE

2,111,713

OUTLET

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Application January 30, 1937, Serial No. 123,033

5 Claims. (Cl. 64—4)

My invention relates to that class of devices used for holding flexible shafts and tubing in place at panel apertures and other outlets.

Although not confined to such use, my invention will be described as applied to an automobile radio receiver. In this type of receiver it is customary to mount the cabinet, containing the radio apparatus, on or adjacent the panel separating the engine compartment from the passenger compartment and to provide a remote control mechanism for controlling said apparatus upon the steering column or upon the instrument panel of the automobile.

Where, as is usually the case, a flexible shaft enclosed in a cable is employed for interconnecting the tuning element with the remotely disposed controls, difficulties may arise at the point where the control shaft enters the radio cabinet. Thus, both electrical and mechanical difficulties may arise if the aperture in the cabinet through which the flexible control shaft passes is not completely shielded. To effect such shielding and to provide a support for the flexible shaft and its sheath, the prior art dictates the use of a threaded bushing passing through the aperture and maintained in position as by lock-nuts contiguous the inner and outer cabinet walls adjacent the aperture. Such connections are usually rigid enough, and, if the bushing panel and sheath are of metal and are electrically continuous, the radio apparatus may be satisfactorily shielded from electrical disturbances which might otherwise be transmitted thereto from the shaft or its sheath. Threaded bushings are, however, expensive to manufacture; they require the use of tools for their installation and are otherwise troublesome.

Accordingly, the principal object of my invention is to provide a simple, inexpensive, readily attachable, trouble-free, combined bushing, support, and ground clamp for flexible shafts and cables, and one which lends itself readily to mass production methods.

Certain details of construction, together with other objects and advantages, will be apparent and my invention itself will be best understood by reference to the following description read in connection with the accompanying drawing, wherein

Figure 1 is a side view partly in section and partly in elevation showing a device constructed in accordance with my invention to support a flexible shaft and its sheath, the shaft serving to control a tuning condenser housed within a metal cabinet, and

Figure 2 is an exploded view illustrative of a preferred manner of constructing the device of my invention.

Referring to Fig. 1, 10 designates a metal panel of a relatively thin-walled cabinet which houses a variable tuning condenser 12. This condenser 12 will be understood to be supported in a suitable manner and has a plurality of rotor plates 14 secured to a rotor shaft 16. The rotor shaft is provided with a worm wheel 18 which meshes with a complementary worm gear 20 which is mounted on a bracket 22 on the front plate 24 of the condenser 12. The axle 26 of worm gear 20 has an insulating coupling member 28 secured thereto as by a set screw 30. The opposite end of member 28 has a pin 32 thereon which engages the forked ends 34 of a terminal 36 of a flexible drive shaft 38.

The panel 10 has an aperture 11 therein through which the flexible shaft 38 extends. For the purpose of maintaining the flexible shaft 38 and the cable or casing 40, within which it is contained in predetermined relation with the panel 10 and in alignment with the driving elements 26—28 of condenser 12, I provide a combined bushing, support and ground clamp indicated generally by reference numeral 42.

As shown in both Figs. 1 and 2, the member 42 is of metal and is substantially funnel-shaped, that is to say, it has an outer narrow cylindrical neck portion 44 and an expanded hollow shell-like body portion 46 whose rim or mouth 48 is of a diameter substantially greater than that of the neck portion 44. The walls of the body portion 46 may be in the shape of a frustrum of a cone or they may be curved in which latter case they preferably bulge outwardly, as in the embodiment shown in the drawing. The wide end of the body portion 46 terminates in a rim 48 which supports a plurality of resilient tongue members 50 which are adapted to be snap-fitted into resilient engagement with the metal edge of the aperture 11, as shown in Fig. 1. The flat surface of rim 48 surrounding tongues 50 extends radially outward beyond the wide end of the body portion 46.

As more clearly shown in Fig. 2, in order to facilitate the manufacture of member 42, it may be formed in two pieces; thus, the resilient tongues 50 may extend outwardly from an annulus 52 which is adapted to be seated within the rim 48 and maintained there as by rolling or beading the rim 48 around it.

In applying the member 42 to the radio device of Fig. 1, the free end of the shaft 38 and its sheath or casing 40 is passed through the body portion 46 and neck portion 44 and the tongues

50 are then force-fitted or snap-fitted into the panel aperture 11. When so fitted the flat surface of the rim 48 abuts the front surface of the panel area immediately the orifice 11 and lends rigidity to the assembly. The terminal of the shaft casing 40 is seated within the narrow neck 44 which is crimped or beaded as indicated at 54 (Fig. 1) to prevent its being accidentally withdrawn therefrom and to provide an electrically continuous connection from the sheath through the body portion 46, rim 48 and resilient tongues 50 to the metal panel 10, which, as indicated at 56 (Fig. 1) is preferably grounded.

Although but a single embodiment of this invention has herein been shown and described, it will be understood that various changes in the size, shape and arrangement of parts may be made without departing from the spirit of my invention, and it is not my intention to limit its scope except as required by the prior art and the spirit of the appended claims.

What is claimed is:

1. A device of the class described comprising a substantially funnel-shape member having an axis of symmetry and a plurality of tongues of resilient material extending outwardly, substantially parallel to said axis, from circumferentially spaced areas about the mouth of said funnel-shape member.

2. A device of the class described comprising a substantially funnel-shape member, a hollow rim surrounding the mouth of said funnel, an annulus seated within said rim, and a plurality of circumferentially arranged tongues of resilient material on said annulus and extending outwardly beyond the mouth of said funnel.

3. A device of the class described comprising a neck portion adapted to receive the terminal of a cable enclosing a flexible shaft, a hollow body portion forming a continuation of said neck portion and terminating in a rim of a diameter substantially greater than that of said cable, and a plurality of tongues of resilient material extending outwardly from said rim substantially parallel to and out of contact with said flexible shaft.

4. A device of the class described comprising a neck portion adapted to receive the terminal of a cable enclosing a flexible shaft, a hollow body portion forming a continuation of said neck portion and having an open end of a diameter substantially greater than that of said cable, a substantially flat-surfaced rim on said body portion surrounding said open end, and a plurality of tongues of resilient material extending outwardly from said open end substantially parallel to and out of contact with said flexible shaft.

5. In combination with a panel having an aperture therein, means for supporting a cable and flexible shaft in predetermined relation with said panel, said means comprising a metal shell having a neck portion adapted to receive a terminal of said cable, a hollow body portion surrounding said flexible shaft and terminating in a rim of a diameter substantially greater than that of said shaft, and a plurality of tongues of resilient material circumferentially arranged about said rim and snap-fitted into resilient engagement with the wall of said aperture.

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