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E. M. GLASER ET AL

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CONTACT DEVICE

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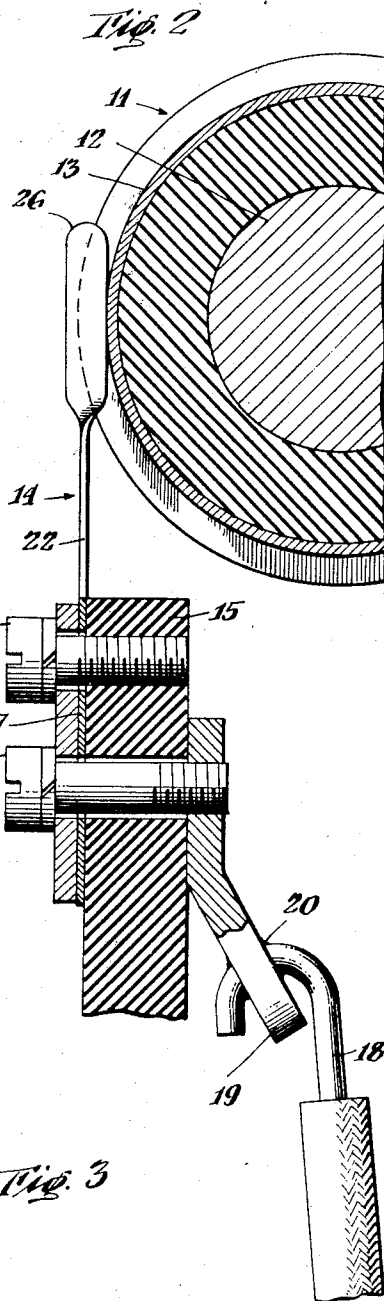
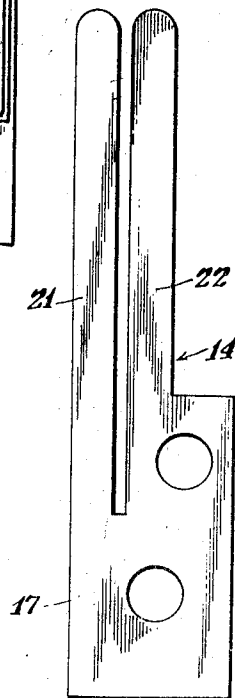
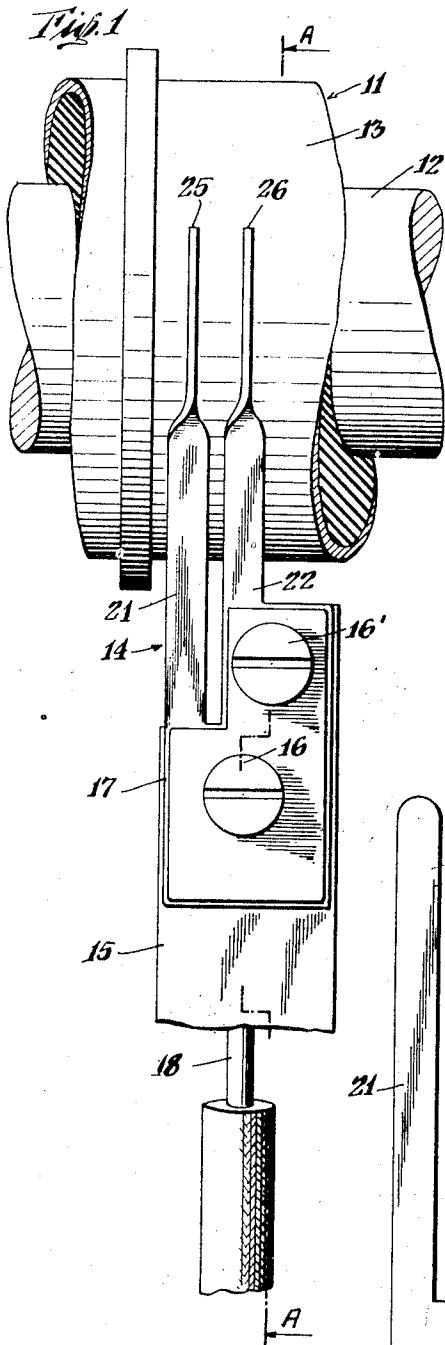


Fig. 3

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1 Claim. (Cl. 171—322)

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This invention relates to electrical apparatus, such as motors, generators, remote transmission units and similar devices wherein relatively moveable contacts are necessary.

One object of this invention is to improve the efficiency and dependability of precision remote control devices such as are used on aircraft to transmit angular movements.

Another object is to provide an electrical contact between relatively moving surfaces, which will not be interrupted by vibrations.

More particularly our invention relates to a so-called brush whereby the current which it carries will not be interrupted under the influence of vibration, and which will impose a minimum frictional load by reason of its contact.

Serious disturbances are experienced in the use of electrical apparatus of the above mentioned class where such apparatus is subject to vibration. On aircraft, for example, vibrations of various frequencies are set up by the engine and other equipment, causing contact disturbances in electrical devices due to the fact that contact brushes, if excited to resonance, will periodically interrupt the circuits in which they lie. The contact interruption leads to sparking at the point of interrupted contact, injury to the contact surfaces by the arc created at the point of interrupted contact, static interference with radio equipment of the aircraft, and faulty performance of the electrical apparatus, such as, for example, an incorrect transmission of a primary motion to a remote point.

The invention provides a contact device which remains in operative contact under severe vibration and comprises a plurality of individual contact elements, the natural frequency of vibration of one contact element being different from the natural frequency of the other.

Although the novel features, which are believed to be characteristic of this invention, will be particularly pointed out in the claim appended hereto, the invention itself, its objects and advantages, and the manner in which it may be carried out, may be better understood by referring to the following detailed description, taken in connection with the accompanying drawing, forming a part thereof, in which—

Fig. 1 is a side elevation of a contact device or brush embodying the present invention wherein is also shown, partly broken away, a rotor;

Fig. 2 is a cross section view at AA of the contact device and cooperative parts shown in Fig. 1; and

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Fig. 3 is a plan view of a blank from which a contact brush embodying the invention may be made.

In the following description and in the claim various details may be identified by specific names for convenience. These names, however, are intended to be as generic in their application as the art will permit. Like reference characters refer to like parts in the several figures of the drawings.

Referring to Figs. 1 and 2, a rotor 11 of an electrical apparatus, which may be a motor, a generator or a remote transmission unit, is mounted on a shaft 12 and equipped with a rotary contact surface 13. The contact surface 13 is shown to be in the form of a slip ring, but it will be apparent that it may also assume the form of a commutator. A contact brush 14 is mounted on a support 15 of insulating material by screws 16 and 16' passing through the base 17 of the brush. A conductor 18 is soldered to a terminal 19, at 20.

The contact brush is made of resilient sheet metal and comprises two arms 21 and 22 integral with the base 17. Each contact arm is provided with a terminal portion 25 and 26, respectively, formed by twisting the end of each arm approximately 90° with respect to the remainder of the arm. The edges of the twisted terminal portions rest against, and make contact with, the slip-ring 13.

The effective length of the arm 21 is greater than that of the arm 22. The lengths of the arms are so selected that the natural frequency and salient harmonics of one arm are dissimilar from the natural frequency and salient harmonics of the other. When, therefore, vibration forces are experienced and one arm is caused to vibrate, the other arm remains in contact with its associated contact surface.

Fig. 3 shows a form of blank of resilient sheet metal from which the contact brush of Figs. 1 and 2 may be made. The blank may be stamped from a sheet or strip of suitable resilient metal, such as Phosphor bronze or beryllium bronze of a thickness corresponding to B & S gauge 38.

We have found that a brush made from such a stamping, when its arms are twisted as shown in Figs. 1 and 2 provides adequate contact in all operating conditions while imposing a braking load on its cooperating surface which is less than that of any practicable brush known to us in the prior art.

Obviously, the present invention is not restricted to the particular embodiment herein

shown and described. It will be apparent from the foregoing disclosure that the contact brush may assume other forms than illustrated in the drawings. It is, however, of primary importance to construct the brush so that it shall have two or more separate arms each of which contacts the slip ring, commutator or other surface with which it cooperates, and so that each arm shall have a different natural frequency of vibration.

What is claimed is:

A contact brush of resilient sheet metal comprising a base portion adapted to be mounted on a support and two strips extending from said base portion and forming contact arms capable of vibrating relatively to said base, the natural frequencies of vibration of the arms being dissimilar, an end portion of each arm being twisted at substantially right angles with regard to the remainder of the arm, the twisted portion forming contact portions.

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