

[72] Inventor Alec John Heap
 Burnley, England

[21] Appl. No. 7,799

[22] Filed Feb. 2, 1970

[45] Patented Dec. 28, 1971

[73] Assignee Joseph Lucas (Industries) Limited
 Birmingham, England

[32] Priority Feb. 11, 1969

[33] Great Britain

[31] 7270/69

[54] **ELECTRICALLY OPERATED SOUND GENERATORS**
 2 Claims, 2 Drawing Figs.

[52] U.S. Cl..... 340/388,
 340/402

[51] Int. Cl..... G08b 3/10

[50] Field of Search..... 340/388,
 402

[56] References Cited

 UNITED STATES PATENTS

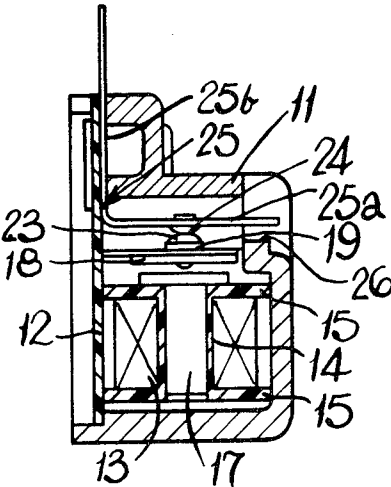
2,791,765 5/1957 Kahn et al..... 340/388

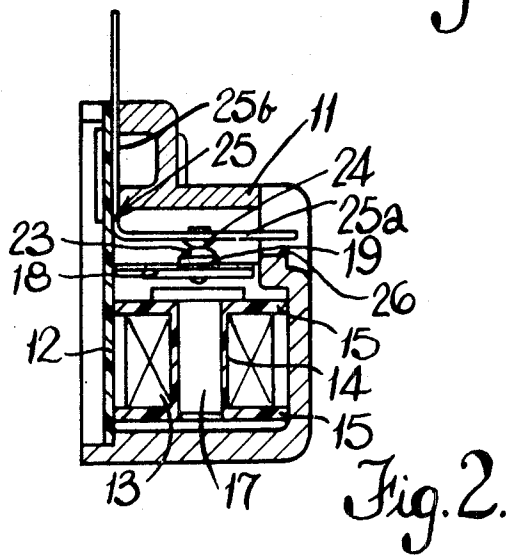
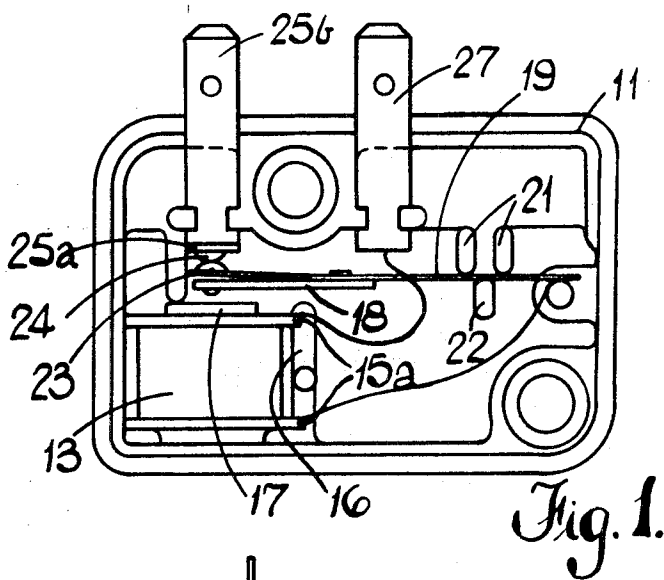
Primary Examiner—Donald J. Yusko

Assistant Examiner—Michael Slobasky

Attorney—Holman and Stern

ABSTRACT: An electrically operated sound generator includes a casing housing a solenoid. A fixed contact is positioned within the casing and is engageable by a movable contact carried by the armature of the solenoid. The fixed and movable contacts are in the energizing circuit of the solenoid, so that when a current is supplied to the sound generator the armature of the solenoid is caused to vibrate, as the energizing circuit of the solenoid is made and broken through the fixed and movable contacts, thereby generating sound. The fixed contact is carried by a deformable metal strip one end of which projects from the casing of the sound generator. In order to effect tuning of the sound generator the projecting end of the strip is moved to deform the strip to alter the position of the fixed contacts relative to the solenoid.





INVENTOR
Alec John Heap.
Holman, Glascock, Downing & Seibold
ATTORNEYS

ELECTRICALLY OPERATED SOUND GENERATORS

This invention relates to electrically operated sound generators of the kind including a casing, a solenoid housed within a casing, a fixed contact within the casing, and a movable contact engageable with the fixed contact, and wherein the movable contact is moved with the armature of the solenoid and the fixed and movable contacts are in the energizing circuit of the solenoid so that when current is supplied to the generator the armature is caused to vibrate, as the energizing circuit of the solenoid is made and broken, thereby generating sound.

According to the invention, in a sound generator of the kind specified the fixed contact is carried by metal strip which is capable of being deformed to alter the position of the fixed contact relative to the solenoid to effect tuning of the sound generator, one end of said strip projecting from the casing to facilitate tuning of the generator.

One example of the invention is illustrated in the accompanying drawings, wherein

FIG. 1 is a plan view of a sound generator with part of the casing omitted, and

FIG. 2 is a sectional view on the line A—A in FIG. 1.

Referring to the drawings, the sound generator includes a moulded synthetic resin casing 11 of open boxlike construction, the open side of which is closed in use by a molded cover plate 12 engaged as a snap fit with the casing 11. Housed within the casing 11 is the winding 13 of a solenoid, the winding 13 being wound on a cylindrical synthetic resin spool 14 having integral outwardly extending flanges 15 at opposite axial ends thereof respectively. The spool 14 is held in the casing by engagement of the flanges 15 with one wall of the casing, and with a lug 16 integral with the casing, the spool 14 being an interference fit between the lug 16 and the wall of the casing 11. The flanges 15 of the spool 14 include respective projections 15a around which the end portions of the winding 13 are looped to secure the winding on the spool. The metal pole 17 of the solenoid extends through the center of the spool 14, and the armature 18 of the solenoid is rivetted to a phosphor bronze spring strip 19 and is spaced from the pole 17, in the rest condition of the strip 19, by a predetermined air gap. The end of the strip 19 remote from the armature 18 is received as an interference fit between a pair of pegs 21 and a further peg 22, the pegs 21, 22, being integral with the casing 11, and serving to retain the strip 19 in position. Adjacent the armature 18 the strip 19 carries a contact 23 which is engageable with a fixed contact 24, the contact 23 and the armature 18 being movable relative to the casing by flexure of the strip 19. The fixed contact 24 is electrically and physically connected to one limb 25a of an L-shaped copper strip 25, the other limb 25b of which is secured to the casing 11. The limb 25b of the strip 25, which is secured to the casing, projects from the casing and is shaped to define a blade terminal, while the limb 25a of the strip 25, which carries the contact 24, projects through a slot 26 in the wall of the casing 11 remote from the cover plate 12.

One end of the winding 13 is electrically connected to the phosphor bronze strip 19, and other end of the winding 13 is electrically connected to a copper strip 27 which is secured to the casing 11, and which extends therefrom in the form of a blade terminal. In the unstressed condition of the strip 19, the armature 18 is spaced from the pole 17 of the solenoid by a predetermined airgap, and the contact 23 is engaged with the fixed contacts 24. Thus, the winding 13 is electrically connected between the blade terminals constituted by the strip 25 and the strip 27, through the intermediary of the contacts 24 the contacts 23 and the strip 19. In use, the blade connector defined by the strip 25 is electrically connected to one pole of ADC source through a control switch, and the blade terminal defined by the strip 27 is electrically connected to the other pole of the DC source. Thus when the control switch is closed, current flows in the winding 13, and the armature 18 is drawn towards the pole 17 thereby flexing the strip 19 and moving the contact 23 out of engagement with the contacts 24. Disengagement of the contact 23 from the contacts 24 breaks the circuit to the winding 13 thereby deenergizing the solenoid, and allowing the armature 18 to be moved away from the pole 17 under the action of the strip 19 thereby moving the contact 23 back into engagement with the contacts 24 and reestablishing the circuit to the winding 13. As long as the control switch remains closed the circuit of the winding 13 will be continually made and broken as the armature 18 and the strip 19 vibrate. The vibration of the strip 19 and the armature 18 generates sound, the frequency of which is dependent upon the frequency of vibration of the strip 19 and armature 18 and the frequency of vibration of the strip 19 and armature 18 can be altered by altering the distance by which the fixed contacts 24 is spaced from the pole 17. Thus, after assembly the generator is tuned by engaging a tool with the portion of the limb 25a of the strip 25 which projects through the slot 26, and then bending the limb 25a to alter the distance by which the contact 24 is spaced from the pole 17.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is:

1. An electrically operated sound generator including a casing, a solenoid housed within the casing and including an armature, a deformable metal strip extending within the casing, a fixed electrical contact carried by said deformable metal strip, a movable electrical contact movable with said armature, means connecting the fixed and movable contacts in circuit with the solenoid, so that when electrical current is supplied to the generator the armature is caused to vibrate as the circuit of the solenoid is made and broken, thereby generating sound, and, said deformable metal strip including a portion which projects from the casing so as to facilitate deformation of said metal strip to alter the position of said fixed contacts, and thereby effect tuning of the sound generator.

2. A sound generator as claimed in claim 1 wherein the end of the strip remote from said projecting portion is shaped to define an electrical terminal on the exterior of the casing.

* * * * *

60

65

70

75