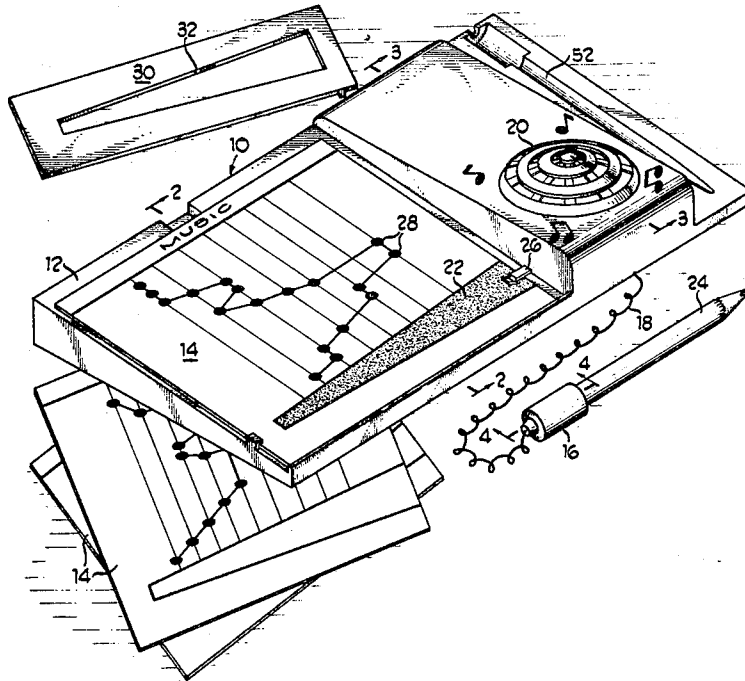


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 [21] Appl. No. **801,305**
 [22] Filed **Feb. 24, 1969**
 [45] Patented **Dec. 29, 1970**
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[54] **TOY ELECTRONIC MUSICAL INSTRUMENT**
6 Claims, 5 Drawing Figs.
 [52] U.S. Cl. **84/1.01,**
 84/1.28, 84/470
 [51] Int. Cl. **G09b 15/04;**
 G10h 1/00, G10h 5/04
 [50] Field of Search **84/1.01,**
 1.04, 1.14, 1.28, D, E, 470, 471, 483

ABSTRACT: A toy musical instrument including an electronic oscillator for producing musical tones through variation of a resistance in the circuit. The variable resistance comprises an area of pencil lead or graphite deposited on a paper sheet, which is contacted by a graphite pencil also connected in the circuit to produce a musical sound. The position of the pencil point along the length of the graphite area determines the amount of resistance in the oscillator circuit and, consequently, the frequency of the sound produced. The paper sheet is preferably marked to indicate the sequence of positions for the pencil point to produce a particular melody.



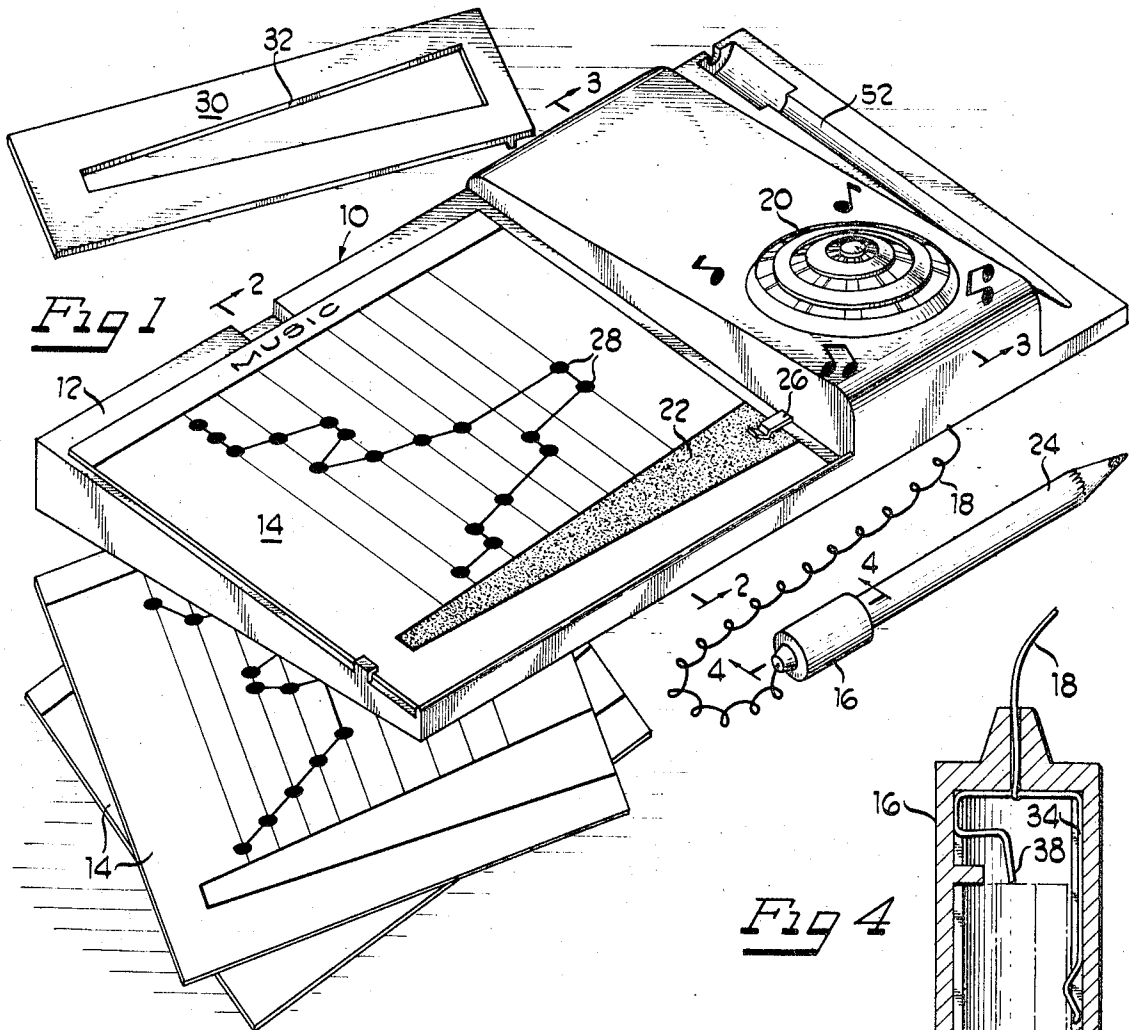


Fig 1

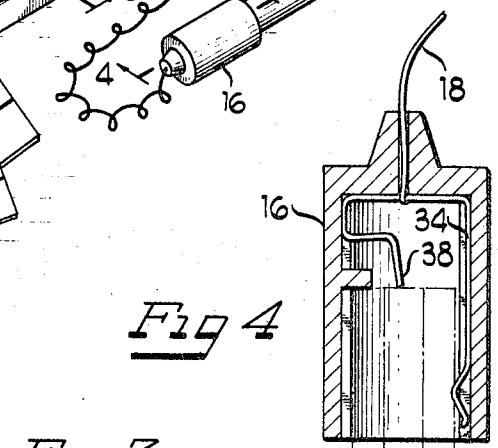


Fig 2

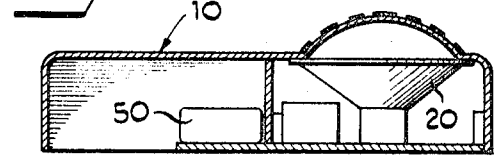


Fig 3

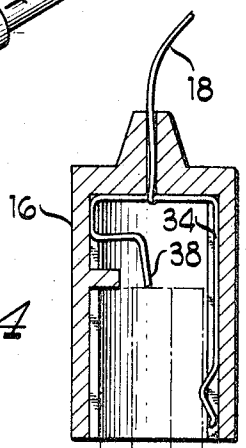


Fig 4

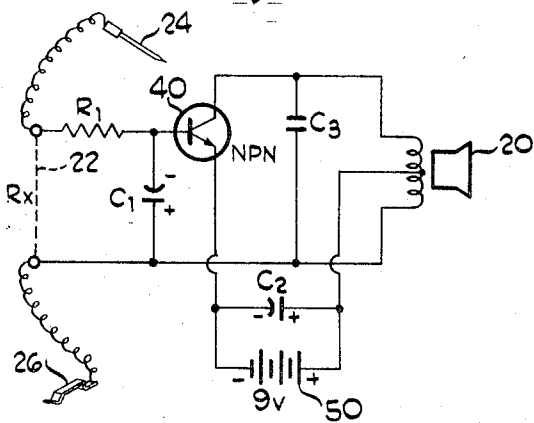


Fig 5

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TOY ELECTRONIC MUSICAL INSTRUMENT

BACKGROUND OF THE INVENTION

The present invention relates to a toy musical instrument and is particularly directed to an electronic instrument wherein the user participates in the conditioning of the instrument so that almost an infinite variety of musical tones can be reproduced.

Toy musical instruments have long been popular with children and the present invention is particularly directed to a toy instrument having a mode of operation which is somewhat magical in nature and, therefore, particularly appealing to the child.

It is a primary object of the present invention to provide a toy musical instrument, which is capable of playing musical tones over a wide range through the establishment of contact between a graphite pencil and an area of graphite deposited on a sheet of paper. A more detailed object of the invention is to provide a toy musical instrument including an oscillator circuit connected with a speaker and including a variable resistance in the form of deposited particles of graphite, wherein musical tones are produced by contacting an ordinary pencil, which is connected in the circuit, with the deposited graphite. Other objects will be apparent from the following description of the selected embodiment of the invention, as illustrated in the accompanying drawings, wherein:

FIG. 1 is a perspective view of the toy musical instrument and its related components;

FIG. 2 is a sectional view taken along the line 2-2 in FIG. 1;

FIG. 3 is a sectional view taken along the line 3-3 in FIG. 1;

FIG. 4 is an enlarged sectional view taken along the line 4-4 in FIG. 1; and

FIG. 5 is a schematic wiring diagram of the electronic circuit used in the toy.

DESCRIPTION OF THE PREFERRED EMBODIMENT

With reference particularly to FIG. 1 of the drawings, it will be seen that the selected embodiment of the invention comprises a generally rectangular frame or housing 10, preferably of plastic, including an inclined upper surface portion 12 for removably receiving sheets of paper 14, a pencil holder 16 connected by a lead wire 18 to an electronic circuit disposed within a closed section of the housing 10, and a speaker 20 within the housing which is also connected with the electronic circuit.

A sheet of paper or the like is coated throughout a predetermined area 22 with graphite particles, as by rubbing an ordinary black lead pencil 24 back and forth across such area, and the paper sheet is then placed on the inclined top 12 with one end of the graphite coated area 22 in contact with a metal contact element 26 forming a portion of the electronic circuit. The electronic circuit is essentially an oscillator, and the circuit is closed by placing the tip of the lead pencil 24 in engagement with any selected portion of the graphite area 22. The graphite area serves as an external resistance in the circuit and, of course, the amount of resistance introduced into the circuit is dependent upon the size of the graphite area extending between the point of pencil contact and the metal clip 26. Variation in this external resistance will result in variation of the tone produced by the oscillator through the speaker.

The range of sounds or notes produced with the described structure can be fairly well determined by the size of the graphite area 22 and thickness of the deposit in such area. Furthermore, by providing a predetermined area of deposit of graphite a fairly accurate musical scale can be reproduced, as indicated on the paper sheets in FIG. 1. Each of the dots 28 in such sheet represent a particular note and signify that, in order to reproduce such note, the pencil 24 should contact the graphite area 22 at that point along its length. Particular melodies can be illustrated for easy following by the child by indicating on the sheet 14 the sequence of the positions to be contacted by the graphite or lead pencil.

It is contemplated that the toy instrument described herein will include a plurality of printed sheets 14, each having sequentially arranged markings 28 to provide for reproduction of a particular song, and the child will complete the sheet for use in the toy by rubbing a pencil across the indicated area 22, which is initially blank, until there is a complete deposit of graphite on the paper. Preferably, the graphite should be deposited uniformly and to an extent such that there is a high gloss appearance of the graphite. In order to accurately guide the child in the placement of graphite on the sheet, there is also provided a template 30 which may be of plastic and which includes a wedge-shaped or trapezoidal opening 32 corresponding with the desired shape of the area of graphite. An ordinary pencil is useable with the toy instrument, with the best results being obtained with a soft pencil, such as a No. 2 or one having even softer lead. The end of the pencil should be without an eraser tip, since it is necessary that as the pencil is placed in the holder 16 the lead must contact the metal clip portion of the holder. As seen particularly in FIG. 4, the pencil holder 16 is a generally cylindrical part having a metal clip 34 at its inner end, which is connected by a wire 18 with the electrical circuit in housing 10 and which also includes a free end portion 38 in position for engagement with the lead in the center of the pencil.

The electrical circuit is essentially an oscillator and in the illustrated embodiment (FIG. 5) includes a transistor 40, three capacitors, C_1 , C_2 and C_3 , a speaker 20, and a battery 50. The selected embodiment is adapted to be powered by a 9 volt transistor radio battery and the transistor 40 is of the NPN type. However, PNP types work just as well with appropriate changes in component polarities. Capacitor C_2 is disposed across the battery in the circuit and serves to stabilize the voltage and thereby sustain the musical note being played by sustaining the frequency rate at the speaker 20. Capacitor C_3 serves primarily to adjust the waveform of the oscillator to provide a more pleasant musical sound. The speaker used in the illustrated embodiment has a center-tapped speaker voice coil. Essentially the circuit provides an oscillation only when the external resistance R_x , i.e. graphite area 22, is introduced into the circuit. The frequency of oscillation, and consequently the musical tone, is determined solely by the amount of external resistance which in turn is determined by the position of the pencil 24 on the graphite area 22.

As seen in FIG. 5, there is another resistance R_1 in the circuit, but this is primarily a safety feature to prevent drain of the battery when the toy is not in use. The resistance R_1 is relatively small but sufficient to effect an audible sound from the speaker 20 in the event that the pencil contacts the exposed metal clip 26. Consequently, if a child should lay the pencil down and it contacts the clip there will be an audible sound to warn the child to remove the pencil. In this respect, there is preferably provided a recess 52 in the frame 10 for holding the pencil 24 and its holder 16 when not in use.

It will, of course, be apparent that the oscillator may take other forms and include other components and that the speaker may be another form of dynamic speaker, such as a lower impedance noncenter/tapped type with a center tapped primary type of output transformer. The described circuitry is an example of a relatively simple circuit which is useable effectively with the external resistance provided by the pencil or graphite deposited area to produce a great variety of musical tones. Very satisfactory results have been achieved with the use of the illustrated circuitry, wherein C_1 is a 0.47 MFD 10 volt mylar capacitor, C_2 is a 25 MFD 10 volt electrolytic capacitor, C_3 is a 0.0022 MFD ceramic disc capacitor, and the speaker 48 is a 2 1/4 inch diameter 50 ohm center-tapped speaker.

It is particularly noteworthy that with the described device a musical tone is produced as long as the pencil contacts the graphite area. Further, such tone is changed by simply shifting the pencil while retaining contact with the graphite area and consequently some very interesting effects can be achieved. For example, by rapidly moving the pencil back and forth

along a length of the graphite area there is produced a tremolo effect.

As indicated previously, the range of musical tones produced with the device is dependent upon the range of the external resistance Rx. A range of eight notes with all of the intermediate tones is easily produced by providing a wedge-shaped area 22 of approximately 6 inches in length which varies from a height or width of about one-fourth inch at the outer end to a width of approximately 1 1/2 inches at the point of contact with the metal clip. The described area 22 provides a fairly uniform spacing of the notes in an octave, while also providing a comfortable spacing between the octave and the contact 26. Of course, such spacing will also provide musical tones if desired. It will also be obvious that the area of graphite can be almost any shape and length, but the spacing of the musical notes produced will vary widely and nonuniformly with such other shapes.

Although shown and described with respect to particular apparatus and circuitry, it will be apparent that modifications might be made without departing from the principles of this invention.

We claim:

1. A toy musical instrument comprising electronic means for generating different musical tones of the scale and including a speaker, an oscillator circuit connected with said speaker, and an external resistance for increment control of the oscillating frequency to produce variation in the tone generated through said speaker.

2. A toy musical instrument as set forth in claim 1, wherein

said external resistance comprises an area of discrete graphite particles, and said circuit includes a relatively movable conductive probe for contacting said graphite area at any position therealong.

3. A toy musical instrument as set forth in claim 2, wherein said probe is a graphite pencil.

4. A toy musical instrument including electronic means for generating different musical tones and comprising, a speaker, an oscillator circuit connected with said speaker and with a variable external resistance, said variable resistance comprising an area of deposited graphite which is connectable in parallel with said oscillator circuit by contact thereof by a conductive probe which is also connected with said oscillator circuit, whereby the amount of resistance and the resulting tone generated by said speaker is determined by the position of said probe in said graphite area.

5. A toy musical instrument as set forth in claim 4, wherein said conductive probe is in the form of a lead pencil having connection at one end with said circuit and having its other end adapted to form said graphite area through moving contact with a sheet of material adapted to receive the graphite.

6. A toy musical instrument as set forth in claim 4, including a sheet of material having said area of deposited graphite thereon and having indicia signifying different musical notes of a melody and arranged in sequence, so that the melody can be reproduced by sequential placement of said probe on said graphite area at the places indicated.

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