March 12, 1963 A. GIRZ 3,080,678

VEHICULAR TOY WITH ACOUSTIC SIGNAL

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FIG. 1

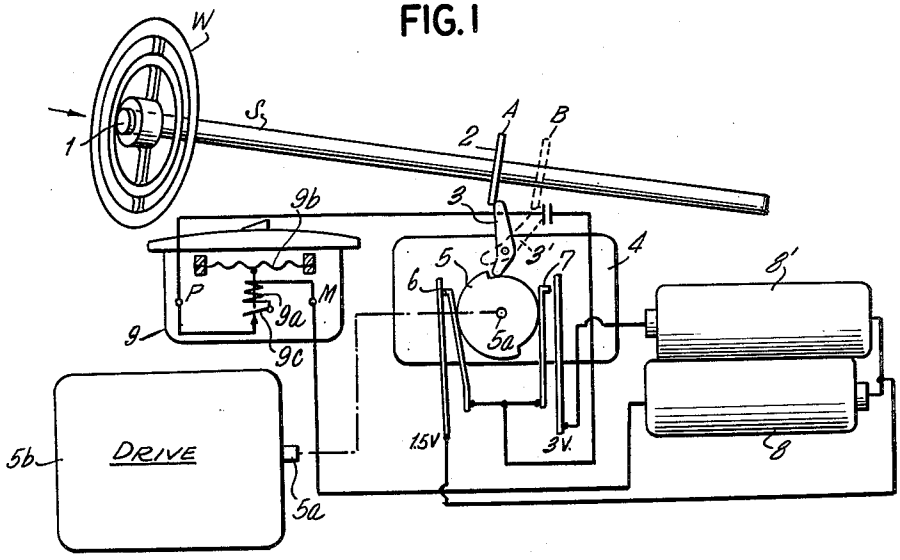


FIG. 2

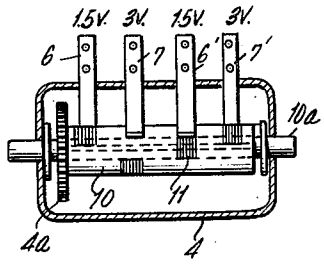


FIG. 2a



FIG. 3

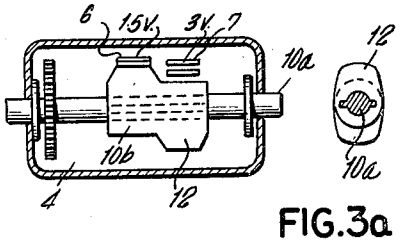


FIG. 3a

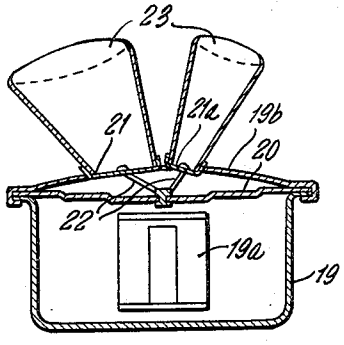


FIG. 7

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FIG. 4

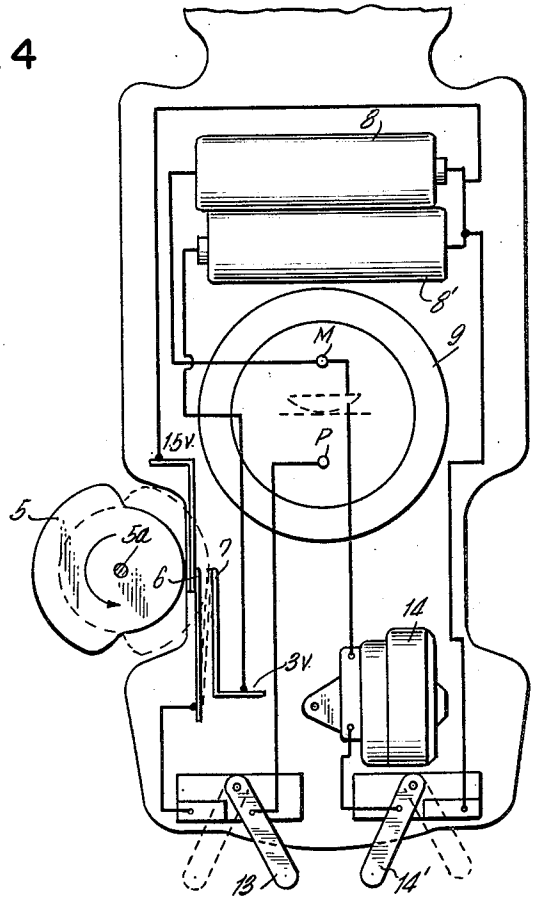


FIG. 5

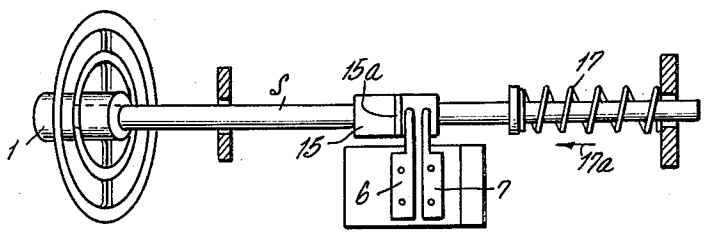
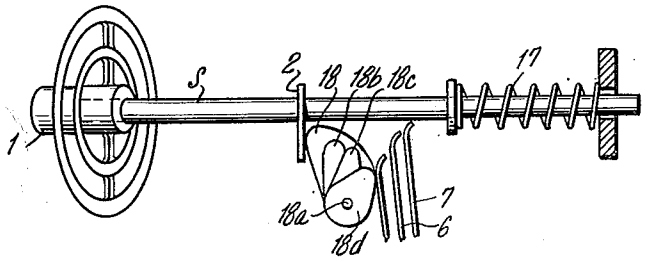


FIG. 6



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3,080,678

VEHICULAR TOY WITH ACOUSTIC SIGNAL

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4 Claims. (Cl. 46—232)

My invention relates to vehicular toys which have an acoustic signalling device for producing musical or noisy sounds, and particularly to toys that simulate an automotive vehicle and have a horn or simulated siren controllable by the playing child.

It is known to provide such toys with a diaphragm device for producing a musical or howling sound, the device being driven mechanically or electrically and controllable either at will, such as by a push-button, or automatically by mechanical or electrical control means, for example in dependence upon the vehicular toy making a right or left turn. In these known toys, the diaphragm device produces a sound or noise of substantially fixed pitch, although the intensity, in some cases, increases with increasing traveling speed or increasing speed of a fly-wheel drive.

It is an object of my invention to devise a vehicular toy with a diaphragm-type signalling device which, in a manner sufficiently simple for use with toys, affords producing tones or noises of markedly different pitch in sequence or as chords of simultaneously sounding tones.

According to my invention, I provide the diaphragm device of the toy with one or more current sources capable of providing a plurality of voltages that are considerably different from each other, for example a voltage of 1.5 volt and a voltage of 3 volts; and I connect these different voltages with the diaphragm device through a selectively actuable switch for thus controlling the diaphragm device to produce differently pitched tones or noises depending upon which particular voltage is active at a time.

By thus applying different voltages to the diaphragm device, preferably under control by mechanical devices actuable by the playing child or automatically, the sound producing diaphragm of the device is subjected to oscillations of respectively different frequencies thus producing a high or low signalling tone respectively.

In general, the diaphragm-type sound producing devices used on actual vehicles or for other applications in industry are known to have substantially one predominant frequency which depends upon the natural frequency of the diaphragm being used so that, when the electric voltage for energizing the diaphragm device fluctuates or changes, the pitch of the sound being produced remains essentially the same, and only the intensity is varied. In contrast thereto, I have found that when a diaprhagm device for use on toys is operated with relatively low voltage under conditions where this voltage changes very greatly, such as in a ratio of 2:1 or more, the pitch of the sound produced by the device changes very greatly so that a distinct difference in predominating frequency is observed, such difference being sufficient to cover the range of a triad, for example. As a result, and by virtue of my invention, a toy device according to the invention effectively simulates, by means of utmost simplicity, the effect otherwise obtainable only with a plurality of tuned diaphragm devices.

The invention will be further described with reference to the embodiments of toys according to the invention illustrated by way of example on the accompanying drawings in which:

FIG. 1 illustrates schematically the steering column and steering wheel of a vehicular toy in conjunction with a signalling device which issues respectively different signal tones under control by a rotating cam.

FIG. 2 is a top view of a drum-type control member for use in a device otherwise according to FIG. 1; and FIG. 2*a* is a cross section of the contact drum.

FIG. 3 is a top view of another embodiment of a control member applicable in a system otherwise corresponding to FIG. 1; and FIG. 3*a* is an axial view of a cam which forms part of the same control member.

FIG. 4 is a schematic top view on part of a vehicular toy equipped with still another signalling device.

FIGS. 5 and 6 show schematically two further embodiments, respectively, of a control switch in combination with the steering column of a toy otherwise similar to that of FIG. 1.

FIG. 7 is a sectional view of a diaphragm-type sound producer applicable in toys according to the invention.

The same reference numerals are used in all ilustrations for functionally similar components respectively.

FIG. 1 relates to an automobile toy with a steering column S and a steering wheel W on the column. Located centrally of the steering wheel W is a push-button **1** which, when depressed, displaces a disc **2** from the position A to the broken-line position B, thus shifting a control lever **3** of a signal switching device **4**. The switching device **4** has a control cam **5** whose shaft **5***a* is connected with a mechanical drive **5***b*, such as a spring-wound drive mechanism, which tends to rotate the cam **5** but is normally stopped by engagement of the control lever **3** with a projection of cam **5**. Only when lever **3** is placed to the broken-line position **3'** by displacement of disc **2**, can the cam **5** operate by rotating continuously in one and the same direction. The cam then actuates two pairs of spring contacts **6** and **7** in a given sequence. These spring contacts are connected with two dry-cell batteries **8** and **8'**, each providing 1.5 volts. When and as long as the contacts **6** are closed, the dry-cell **8** is connected to the terminals P and M of a diaphragm device **9**. A magnet **9***a* in the diaphragm device, connected with a self-interrupter contact **9***c*, then causes the diaphragm **9***b* to oscillate and to produce a tone of relatively low pitch under the effect of 1.5 volts furnished from dry-cell **8**.

When the spring contacts **7** are closed, the terminals of the diaphragm device **9** are connected in additive relation to both dry cells **8** and **8'** so that now a total voltage of 3 volts is applied to the diaphragm device. As a result the device now produces a tone or noise of higher pitch.

Instead of providing the switching device **4** with a control cam, as described above, it may also be equipped with a drum-type contact mechanism according to FIGS. 2 and 2a. The contactor drum **10** is mounted on a shaft **10***a* which also carries a spur gear **4***a* to be driven from the driving mechanism. During rotation of drum **10**, its contact segments **11** sequentially establish a circuit-closing connection between the contact springs **6**, **6'** and **7**, **7'** respectively, thus connecting the diaphragm device **9** (FIG. 1) sequentially with 1.5 volts and 3 volts in order to change the pitch of the sound being produced.

According to the modification shown in FIGS. 3 and 3*a*, the switching device **4** is provided with a cam member **10***b* with cam projections **12** which, during rotation of member **10***b*, alternately close the contacts **6** and **7**, thus also operating in the manner described above. In all other respects the device of FIG. 3 is similar to that of FIG. 2.

The switching devices as shown in FIGS. 2 and 3, depending upon their particular design, may be placed in operation during straight-forward travel or standstill of the vehicular toy. If desired, the control structure on the steering column may be so designed that the switching device will also operate automatically when the vehicular toy makes a right or left turn.

In the toy illustrated in FIG. 4, a control switch with a cam 5 and contact springs 6, 7 similar to those shown in FIG. 1 is used, but the switch is controlled by means of a separate on-off switch 13. The shaft 5*a* of cam 5 may be driven from an electric motor 14 which also serves as a propulsion drive for the running wheels of the toy. The motor 14 is controlled by another on-off switch 14' and is energized from one or both of the same batteries 8, 8' that energize the diaphragm-type sound producer 9. A clutch may be provided between the motor 14 and the driven running wheels to permit operating the switch device 4 at standstill of the vehicular toy.

When the switch 13 is shifted from the off position to the on position shown by a dot-and-dash line, the diaphragm device 9 receives alternately 1.5 volts from battery 8 through contacts 6, and 3 volts from series-connected batteries 8 and 8' through contacts 7, thus operating essentially in the same manner as described above with reference to FIG. 1.

In the modification illustrated in FIG. 5, the contact pairs 6 and 7 are controlled by a control member 15 directly mounted on the steering column S of the toy. The push-button 1 in this embodiment is firmly joined with the steering column S, and the steering column is normally biased by a spring 17 in the direction indicated by an arrow 17*a*. When depressing the push-button 1, the entire steering column S with the control member 15 is shifted toward the right so that a projection 15*a* of member 15 first engages the contact springs 6, of which only one is visible in the illustration. This closes the contact springs 6 and causes the diaphragm device to receive 1.5 volts for producing a tone of low pitch. When the push-button 1 and the steering column S are shifted farther toward the right, the projection 15*a* engages the contact springs 7 and thus supplies the diaphragm device with 3 volts for producing a tone of high pitch.

The embodiment shown in FIG. 6 is generally similar to that of FIG. 5, except that the steering column S is provided with a disc 2 which acts upon a cam 18 rotatably mounted on a shaft 18*a*. Mounted on the same shaft are additional cams 18*b*, 18*c* and 18*d*, which when the steering column is shifted toward the right, act sequentially on a number of contact springs 6, 7, to sequentially supply the diaphragm device with 1.5 volts and 3 volts, respectively.

While the diaphragm device may have a single diaphragm as schematically illustrated in FIG. 1, it may also be provided with a plurality of diaphragms for the purpose of producing a musical chord or other combination of simultaneously sounding tones. Such a diaphragm device is illustrated in FIG. 7. The housing 19 of the sound producer comprises an electromagnet 19*a* which acts upon a diaphragm 20. Mounted on top of the housing is a cover 19*b* to which two additional diaphragms 21 and 21*a* are attached. The diaphragms 21 and 21*a* have respectively different diameters for producing tones of respectively different pitch. The diaphragms 21 and 21*a* are resiliently connected with the main diaphragm 20 by elastic links 22 and thus are excited by the vibrations of the main diaphragm. The additional diaphragms 21 and 21*a* are located at the bottom of two horns 23 fastened to the cover 19*b*. When the main diaphragm is excited by magnetic pulses, the individual diaphragms 21 and 21*a* are likewise excited and the device produces a melodic sound or chord.

It will be obvious to those skilled in the art, upon studying this disclosure, that my invention permits of a great variety of modifications and hence may be embodied in devices other than those particularly illustrated and described herein, without departing from the essential features of my invention and within the scope of the claims annexed hereto.

I claim:

1. A vehicular toy having a drive and being controllable for producing sounds of varying pitch, comprising a signal-tone producing diaphragm device having an electric energizing circuit, current supply means having a plurality of respectively different voltages, a periodic switching device having a rotatable member and having a plurality of contacts engaged by said member and sequentially actuable by rotation of said member, said contacts connecting said respective voltages to said noise-making device for controlling it to produce tones of respectively different pitch, said drive being connected with said member for rotating it, and a start-stop control member for releasing and arresting said drive.

2. A vehicular toy having a drive and being controllable for producing sounds of varying pitch, comprising a steering wheel, a signal-tone producing diaphragm device having an electric energizing circuit, current supply means having a plurality of respectively different voltages, a periodic switching device having a rotatable member and having a plurality of contacts engaged by said member and sequentially actuable by rotation of said member, said contacts connecting said respective voltages to said noise-making device for controlling it to produce tones of respectively different pitch, said drive connected with said member for rotating it, and a push-button mounted centrally of said steering wheel for releasing said drive when said push-button is depressed.

3. A vehicular toy having a drive and being controllable for producing sounds of varying pitch, comprising a signal-tone producing diaphragm device having an electric energizing circuit, current supply means having a plurality of respectively different voltages, a periodic switching device having a rotatable contact drum and having a plurality of contact springs engageable with said drum and sequentially closable by rotation of said drum, said contacts connecting said respective voltages to said noise-making device for controlling it to produce tones of respectively different pitch, said drive being connected with said drum for rotating it, and start-stop control means for releasing and arresting said drive.

4. A vehicular toy having a drive and being controllable for producing sounds of varying pitch, comprising a steering column, a steering wheel on said column, a structure mounted on said column and axially spaced from said wheel, a push-button mounted centrally of said wheel and connected with said structure for axially displacing said structure by actuation of said push-button, an acoustic signal-producing device having an electric energizing circuit, current supply means having a plurality of respective voltages, a rotatable switch member, a plurality of switch contacts controlled by rotation of said member and connecting said respective voltages to said device for controlling it to produce tones of respectively different pitch, and means linking said structure with said switch member for starting and stopping it under control by said push-button.

References Cited in the file of this patent

UNITED STATES PATENTS

1,016,699	Manson	Feb. 6, 1912
1,172,713	Hutchison	Feb. 22, 1916
2,505,626	Palmer	Apr. 25, 1950
2,583,658	Lichko	Jan. 29, 1952
2,639,545	Pastorius	May 26, 1953
2,670,467	Best et al.	Feb. 23, 1954
2,803,004	White	Aug. 13, 1957
2,896,202	Bonanno	July 21, 1959

FOREIGN PATENTS

525,080	Great Britain	Aug. 21, 1940