Dec. 15, 1964 J. W. RYAN 3,160,984

MOTOR SIMULATING SOUNDING TOY

Filed April 22, 1964 2 Sheets-Sheet 1

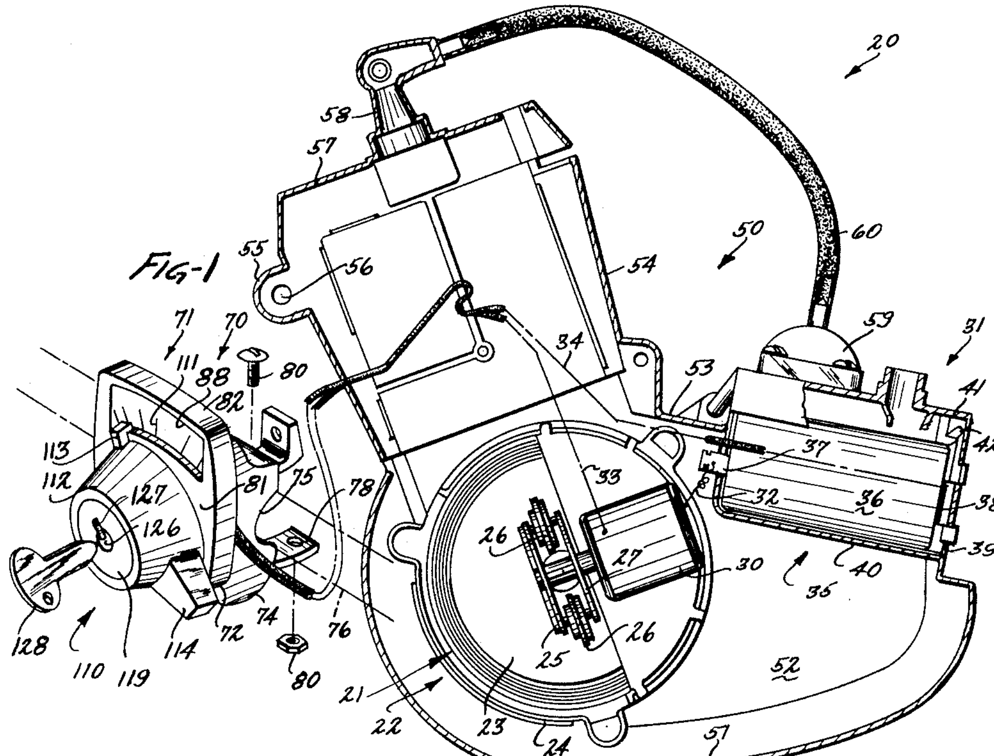

FIG-1

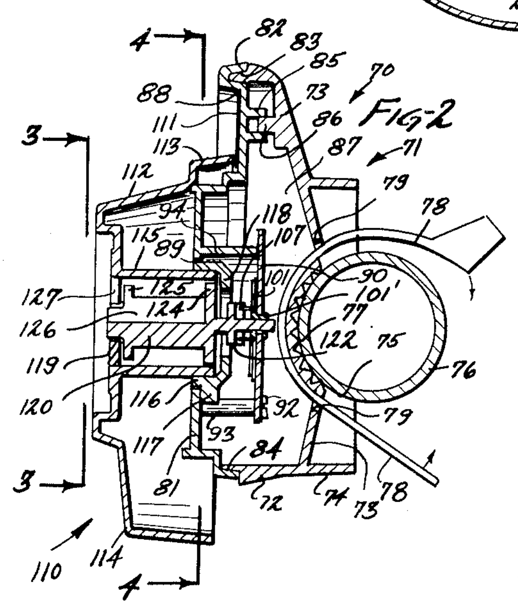

FIG-2

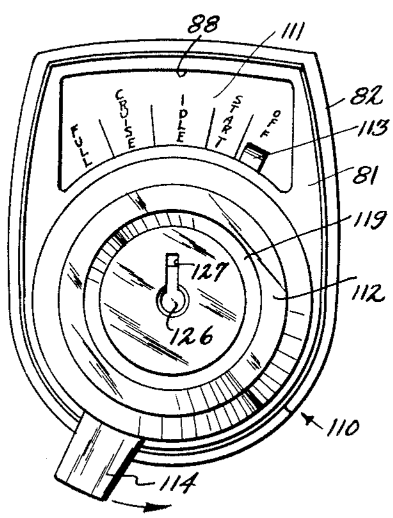

FIG-3

INVENTOR.
JOHN W. RYAN

BY Herzig & Walsh
ATTORNEYS

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FIG-4

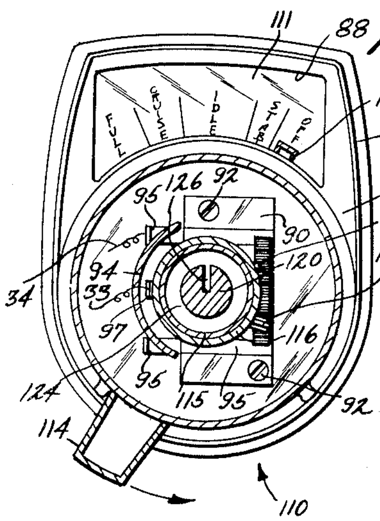


FIG-5

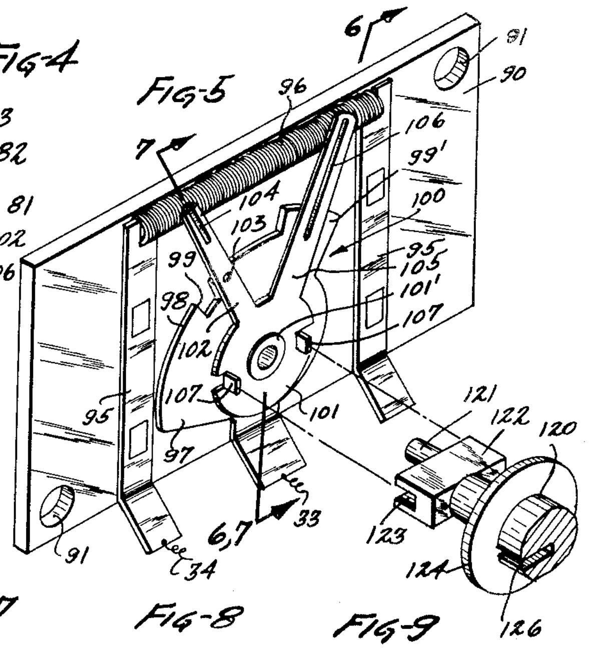


FIG-6

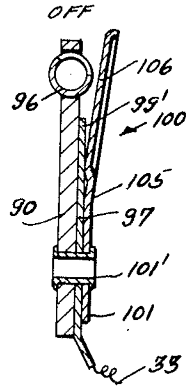


FIG-7

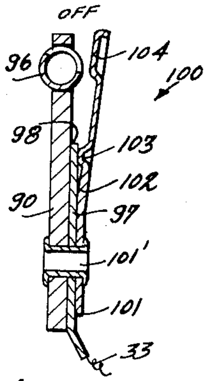


FIG-8

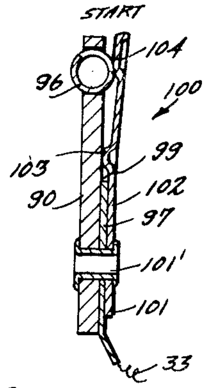
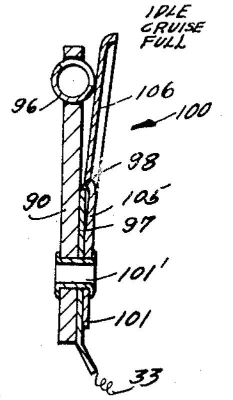


FIG-9



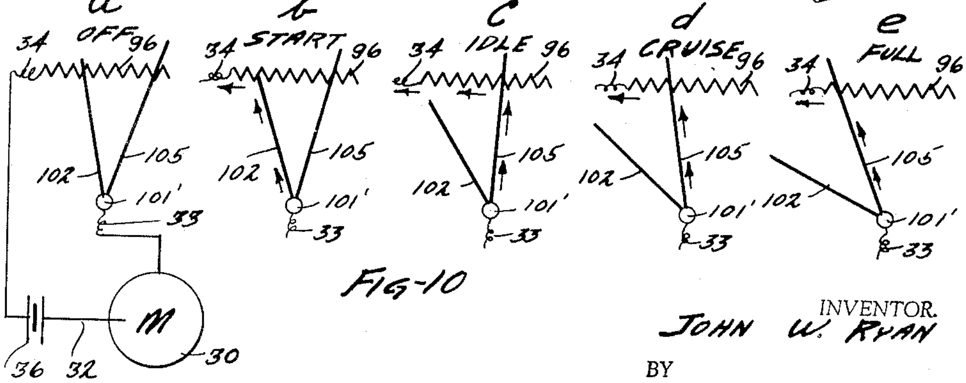


FIG-10

INVENTOR.
JOHN W. RYAN

BY
Herzig & Walsh
ATTORNEYS

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3,160,984
MOTOR SIMULATING SOUNDING TOY
John W. Ryan, 688 Nimes Road, Bel Air, Calif.
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4 Claims. (Cl. 46—232)

In general, the present invention relates to a control means for a toy motor sound device. More particularly, the present invention involves a control means adapted to regulate the sounds of a toy motor sound device to reproduce the usual operational cycle of a motor.

Customarily, the toy motor sound devices utilized by the prior art involved a direct mechanical connection with a rotating member, such as a wheel axle. Thus, when the wheel turned, the motor sound was emitted and the sound could not be controlled independently of the wheel motion. Furthermore, such operation does not, of course, correspond to the actual operation of a motor on a vehicle, such as a motorcycle. For example, both during starting and when the motor is idling, the motor operates although the wheels of the vehicle do not turn. In addition, the lack of control means on prior art toy motor sound devices prevented realistic reproduction of such features of motor operation as utilizing a key to turn the motor on and a throttle to regulate the motor speed to the desired level.

Consequently, an object of the present invention is a toy motor sound control means adapted to regulate the sounds of a toy motor sound device to reproduce the usual operational cycle of a motor.

Another object of the present invention is a toy motor sound control means which requires an externally removable key connection to regulate the sounds of the toy motor sound device.

Still another object of the present invention is a toy motor sound control means which is adapted to reproduce the usual operational cycle of a motor by rotation in a single direction.

Other objects and advantages of the present invention will be readily apparent from the following description and drawings which illustrate a preferred exemplary embodiment of the present invention.

In general, the present invention involves a toy motor sound device operated by an electric motor powered by an electric power source. The intensity and rapidity of repetition of the sounds produced by the motor sound device are proportional to the input voltage to the motor from the power source. Such input voltage is varied by regulator means to reproduce the usual operational cycle of motor sounds from said motor sound device. The regulator means, in turn, is operated by actuator means which include an externally removable key joining the actuator means to the regulator means.

In order to facilitate understanding of the present invention, reference will now be made to the appended drawings of a preferred specific embodiment of the present invention. Such drawings should not be construed as limiting the invention which is properly set forth in the appended claims.

In the drawings:

FIG. 1 is a partial cross-sectional and partial perspective view of the toy motor sound control means of the present invention;

FIG. 2 is a cross-sectional view of the regulator means and the actuator means portions of FIG. 1 when mounted on the handlebars of a bicycle;

FIG. 3 is a front view of FIG. 2 taken along line 3—3 of FIG. 2;

FIG. 4 is a cross-sectional view of FIG. 2 taken along line 4—4 of FIG. 2;

FIG. 5 is a partially exploded perspective view of a

portion of the regulator means of the present invention;

FIG. 6 is a cross-sectional view of FIG. 5 taken along line 6—6 of FIG. 5 showing the "off" position of a portion of the regulator means;

FIG. 7 is a cross-sectional view of FIG. 5 taken along line 7—7 of FIG. 5 showing the "off" position of another portion of the regulator means;

FIG. 8 is a cross-sectional view similar to FIG. 6 showing the "start" position of the regulator means;

FIG. 9 is a cross-sectional view similar to FIG. 7 showing the "idle," "cruise" and "full power" positions of the regulator means; and

FIGS. 10*a*, *b*, *c*, *d* and *e* are schematic diagrams illustrating the operation of the regulator means in various operating positions.

As illustrated in FIGS. 1–9, the present invention involves a toy motor sound control means **20** including a motor sound device **21** operated by an electric motor **30** powered by an electric power source **31**. The input voltage to the electric motor **30** from the electric power source **31** is varied by a regulator means **70**. The regulator means **70** in turn is operated by an actuator means **110**.

The motor sound device **21** is described in applicant's copending application, Serial No. 313,285 filed October 2, 1963, entitled Motor Sounds. As described therein and shown partially in FIG. 1, the motor sound device **21** includes a resonator **22** adapted to emit an internal combustion motor sound when struck and a rotatably mounted impeller **25** having at least one lug mounted on its periphery and adapted to strike the resonator **22** during the rotation of the impeller **25**. More specifically, the resonator **22** comprises a flexible membrane **23** mounted on a frame **24**. Similarly, the impeller **25** comprises a plurality of lugs **26** mounted around a spindle **27** which is rotated by the electric motor **30**. The electric motor **30** is a D.C. motor so that the rate of rotation of the spindle **27** is proportional to the input voltage to the electric motor **30**. Consequently, the intensity and rapidity of repetition of the sounds produced by the motor sound device **21** is proportional to the input voltage to the electric motor **30**.

The electric motor **30** is connected to the power source **31** directly by a first lead wire **32** and indirectly by a second lead wire **33** which is connected to the regulator means **70**. The regulator means **70** is in turn connected to the power source **31** by a third lead wire **34**. The power source **31** includes a compartment **35** formed within the motor casing **50** which is described below. The compartment **35** contains at least one battery **36** having one electrode contacting a metal lug **37** which is attached to the lead wire **32**. The other battery electrode is braced against a metal clip **38** mounted on the outer wall **39** of the compartment **35** and attached to lead wire **34**. The battery **36** is enclosed and supported by an inner wall **40** and an outer wall **39** which is secured to a removable cap **41** by latching means **42**. The cap **41** permits access to the battery **36** for purposes of periodic replacement.

The motor sound device **21** and the electric motor **30** are enclosed in the motor casing **50** which simulates the outer construction of an actual motor and is adapted to be mounted on a frame, such as a bicycle or tricycle frame. Thus the motor casing **50** includes a rounded lower wall **51** in which is formed a chamber **52**. The chamber **52** is partially enclosed by the compartment **35** whose outer wall **39** and cap **41** form part of the casing **50**. The chamber **52** is also partially covered by a top wall **53** and a cylinder wall **54** mounted thereon which simulates an actual air-cooled motor cylinder wall. Mounted on the casing **50** are a plurality of ears **55** having apertures **56** therein which are adapted to mount the casing 50 on a frame. The cylinder wall 54 is surmounted by a head wall 57 which has a simulated spark plug 58 mounted thereon. The spark plug 58 is connected to a simulated distributor cap 59 mounted on the compartment cap 41 by a spark wire 60 to further simulate the appearance of an actual motor.

As noted above, the electric motor 30 is connected to the power source 31 through the regulator 70. The regulator means 70 is adapted to vary the input voltage to the electric motor 30 to reproduce the usual operational cycle of motor sounds from the motor sound device 21. Also, since the regulator means 70 is connected to the electric motor 30 and the power source 31 solely by lead wires 33 and 34, it may be substantially spaced therefrom. Thus, the regulator means 70 may be mounted on the handlebars of the bicycle or tricycle. The regulator means 70 comprises a housing 71 including a bottom wall 72 and a rear wall 73 from which extends rearwardly a circular flange 74. The flange 74 has an aligned pair of notches 75 which are adapted to receive the handlebar 76 of a bicycle or tricycle. Within the flange 74 is a serrated recess 77 in the rear wall 73 which is also adapted to receive the handlebar 76 which is clamped therein by a flexible band 78 (FIG. 2). The band 78 is inserted through holes 79 in the rear wall 73 and secured around the handlebar 76 by a nut and bolt 80. The housing 71 also has a front wall 81 which is attached to the rear wall 73 by a rearwardly extending flange 82 which is seated on shoulders 83 and 84 formed in the rear wall 73 and the bottom wall 72, respectively, and by a rearwardly extending socket 85 which receives an interior boss 86 formed on the rear wall 73. The front wall 81 encloses a chamber 87 within the housing 71.

Mounted in the chamber 87 of the housing 71 is a support panel 90 having a spaced pair of holes 91 through which are inserted screws 92. The screws 92 are threaded into posts 93 extending inwardly from the front wall 81 to attach the support panel 90 to the front wall 81. In addition, the support panel 90 is held in position by struts 94 which extend rearwardly from the front wall 81 and are braced against the support panel 90. Joined to the support panel 90 are a spaced pair of lead strips 95 which have a resistance coil 96 extending therebetween. Also between the lead strips 95, a base plate 97 is joined to the support panel 90. The base plate 97 includes a substantially circular rim 98 adjacent the resistance coil 96. The rim 98 has a notch 99 adjacent the end of the resistance coil 96 to which the lead wire 34 is attached and an extension 99′ adjacent the opposite end of the resistance coil 96.

The regulator means 70 particularly comprises the resistance coil 96 and contact means 100 adapted to electrically connect the electric power source 31 to the electric motor 30 and to vary the input voltage to the electric motor 30 by varying the position of the contact means 100 along the length of the resistance coil 96. Specifically, the regulator means 70 is adapted to reproduce the usual operational cycle of motor sounds from the motor sound device by rotation in a single direction. The contact means 100 comprises a disk 101 rotatably mounted by a rivet 101′ on the base plate 97. The disk 101 has a first prong 102 and a second prong 105 adapted to contact the resistance coil 96 in a set sequence determined by their contact with the base plate 97 during the rotation of the disk 101. The first prong 102 has a boss 103 adapted to ride on the base plate 97 during rotation of the first prong 102 and to drop into the notch 99 of the base plate 97 after a predetermined amount of rotation of the first prong 102. Extending from the first prong 102 adjacent the resistance coil 96 is a ridge 104 which is held spaced from the resistance coil 96 by the boss 103 when the boss 103 rides on the base plate 97 (FIG. 7) and contacts the resistance coil 96 when the boss 103 drops into the notch 99 (FIG. 8). The second prong 105 has a ridge 106 adapted to ride on the extension 99′ of the base plate 97 during rotation of the second prong 105 and to drop off the extension 99′ after a predetermined amount of rotation of the second prong 105. The ridge 106 extends adjacent to the resistance coil 96 and is held spaced therefrom when the ridge 106 rides on the extension 99′ of the base plate 97. When the ridge 106 drops off the extension 99′, it contacts the resistance coil 96. In summary, the regulator means 70 includes a base plate 97 and contact means 100 comprising a disk 101 rotatably mounted on the base plate 97 and having two prongs 102 and 105 adapted to contact the resistance coil 96 in a set sequence determined by their contact with the base plate 97 during the rotation of the disk 101.

The regulator means 70 is operated by actuator means 110 which includes an externally removable key 128 joining the actuator means 110 to the regulator means 70. The actuator means 110 includes a scale 111 set in a recess 88 in the front wall 81 of the regulator means 70 and a knob 112 having a pointer 113 mounted thereon and adapted to indicate on the scale 111 the angular position of the knob 112. The knob 112 also has a lug 114 extending therefrom to facilitate its rotation. The knob 112 is rotatably mounted on the front wall 81 of the regulator means 70 by an internal, inwardly extending sleeve 115 which is inserted in a port 89 in the front wall 81. The sleeve 115 has a collar 116 mounted about the exterior of its inner end with the collar 116 adjoining the sides of the port 89 and extending within the chamber 87 of the regulator means 70. Mounted on the exterior of the collar 116 and riding on the inner surface of the front wall 81 are lugs 117 adapted to engage the actuator means 110 with the regulator means 70. Also, lugs 117, by contacting the posts 93 and struts 94, limit the rotation of the knob 112 so that pointer 113 is maintained on scale 111.

Rotatably mounted within the sleeve 115 is a key shaft 120 by means of a spindle 12 slidably inserted in the rivet 101′ on the panel board 90. Fixed to the key shaft 120 is a block 122 having a channel 123 formed therein and opening inwardly. The channel 123 engages the ears 107 formed out of disk 101 whereby the rotation of the key shaft 120 causes rotation of the disk 101. Along the central portion of the key shaft 120 are a spaced pair of outwardly extending circular flanges 124 and 125 whose rims are adapted to ride on the inner surface of the sleeve 115. Longitudinal movement of the key shaft 120 is prevented at the inner end of the sleeve 115 by an inwardly extending rim 118 on the collar 116 and at the outer end by a similar inwardly extending rim 119 on the sleeve 115. The key shaft 120 has a longitudinal slot 126 formed therein which extends to and is adapted to be aligned with a corresponding hole 127 in the rim 119. Thus, by insertion of the key 128 in the hole 127 and slot 126, the sleeve 115 becomes mechanically engaged with the key shaft 120. Consequently, the knob 112 can be connected to the regulator means 70 by the key 128, since, as noted above, the key shaft 120 is adapted to rotate the disk 101.

The operation of the motor sound control 20 is initiated by the insertion of the key 128 into the hole 127 of the knob 112 and the slot 126 of the key shaft 120. Without such key connection, the knob 112 rotates freely without affecting the regulator means 70. The cycle of operation of the motor sound control 20 is illustrated in FIGS. 10*a* and 10*e* with the corresponding positions of the contact means 100 shown in FIGS. 6–9. Initially, when the regulator means 70 is in an "off" position (FIG. 10*a*), the ridge 104 of the first prong 102 is held away from the resistance coil 96 by the boss 103 riding on the base plate 97 (FIG. 7) and the ridge 106 on the second prong 105 is held away from the resistance coil 96 by its engagement with extension 99′ of the base plate 97 (FIG. 6). As the knob 112 is then turned in a counterclockwise direction, the pointer 113 indicates the "start" position on the scale 111. Concurrently, the disk 101 is rotated so that the boss **103** drops into the notch **99** in the base plate **97** and the first prong **102** contacts the resistance coil **96** (FIG. 8) adjacent the lead wire **34** (FIG. 10*b*). Because of the short length of resistance coil **96** in the electric circuit, the input voltage to the electric motor **30** is high so that intense, rapid motor sounds are produced corresponding to the starting of a motor. As the knob **112** is then turned further in a counterclockwise direction, the pointer **113** successively indicates the "idle," "cruise" and "full" positions on the scale **111**. Concurrently, the disk **101** is rotated so that the boss **103** again rides on the base plate **97** and the first prong **102** again is held away from the resistance coil **96**. Also, the ridge **106** drops off the extension **99'** of the base plate **97** and the second prong **105** contacts the resistance coil **96** (FIG. 9). The initial contact of the second prong **105** and the resistance coil **96** ("idle" position) is remote from the lead wire **34** (FIG. 10*c*) so that a long length of the resistance coil **96** is in the electric circuit and the input voltage to the electric motor **30** is low. Consequently, soft, slow motor sounds are produced corresponding to the idling of the motor. Further counterclockwise rotation of the knob **112** maintains the contact of the prong **105** with the resistance coil **96** while successively reducing the length of the resistance coil **96** in the electric circuit (FIG. 10*d* and 10*e*). Consequently, the motor sounds get more intense and rapid corresponding to the cruising and full-speed operation of a motor. Thus, by rotation of the knob **112** in a single direction, the usual cycle of motor sounds is achieved.

There are many features in the present invention which clearly show the significant advance it represents over the prior art. Consequently, only a few of the more outstanding features will be pointed out to illustrate the unexpected and unusual results attained by the present invention. One feature of the present invention is not only the control of the motor sounds produced, but, also, its regulation over the usual operational cycle of motor sounds. Still another feature of the present invention is the operation of the motor sound control by rotation in a single direction. Still another feature of the present invention is the use of a key to connect the throttle knob with the regulator means so that they may be disconnected, when desired, by the operator.

It will be understood that the foregoing description and examples are only illustrative of the present invention and it is not intended that the invention be limited thereto. All substitutions, alterations and modifications of the present invention which come within the scope of the following claims or to which the present invention is readily susceptible without departing from the spirit and scope of this disclosure are considered part of the present invention.

I claim:

1. A motor simulating device comprising: a casing configured to simulate an internal combustion engine and adapted to be removably mounted on a wheeled vehicle; a vibratory diaphragm means in said casing; a rotary member adjacent said diaphragm means and having spaced striker elements thereon adapted to strike said diaphragm means upon rotation of said member to produce sound simulating an internal combustion engine sound; electric motor means for driving said rotary member independently of movement of said vehicle; control means for said electric motor means for starting and stopping the same and varying the speed thereof, said control means including a rheostat means and a manually operable member for actuating said rheostat means, outside said casing.

2. A motor simulating device comprising: a casing configured to simulate an internal combustion engine and adapted to be removably mounted on a wheeled vehicle; a vibratory diaphragm means in said casing; a rotary member adjacent said diaphragm means and having spaced striker elements thereon adapted to strike said diaphragm means upon rotation of said member to produce sound simulating an internal combustion engine sound; electric motor means for driving said rotary member independently of movement of said vehicle; control means for said electric motor means for starting and stopping the same and varying the speed thereof, said control means including a rheostat means and a manually operable member for actuating said rheostat means, outside said casing, said rheostat means including a plurality of arms for separate control of electric current to said motor to effect said variation of speed and being operable by said manually operable member.

3. A motor simulating device comprising: a casing configured to simulate an internal combustion engine and adapted to be removably mounted on a wheeled vehicle; a vibratory diaphragm means in said casing; a rotary member adjacent said diaphragm means and having spaced striker elements thereon adapted to strike said diaphragm means upon rotation of said member to produce sound simulating an internal combustion engine sound; electric motor means for driving said rotary member independently of movement of said vehicle; control means for said electric motor means for starting and stopping the same and varying the speed thereof, said control means including a rheostat means and a manually operable member for actuating said rheostat means, outside said casing, said rheostat means being separate from said casing and provided with means for mounting the same on said vehicle at a location remote from said casing.

4. A motor simulating device comprising: a casing configured to simulate an internal combustion engine and adapted to be removably mounted on a wheeled vehicle; a vibratory diaphragm means in said casing; a rotary member adjacent said diaphragm means and having spaced striker elements thereon adapted to strike said diaphragm means upon rotation of said member to produce sound simulating an internal combustion engine sound; electric motor means for driving said rotary member independently of movement of said vehicle; control means for said electric motor means for starting and stopping the same and varying the speed thereof, said control means including a rheostat means and a manually operable member for actuating said rheostat means, outside said casing, said rheostat means comprising a rotary control element; said manually operable member being normally freely rotatable about the axis of rotation of said control element; and removable key means keying said manually operable member and control element together for simultaneous rotation about said axis.

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DELBERT B. LOWE, *Primary Examiner.*

RICHARD C. PINKHAM, *Examiner.*