Jan. 10, 1933. C. W. HUMMER 1,893,897

TOY VEHICLE

Filed March 2, 1932 4 Sheets-Sheet 1

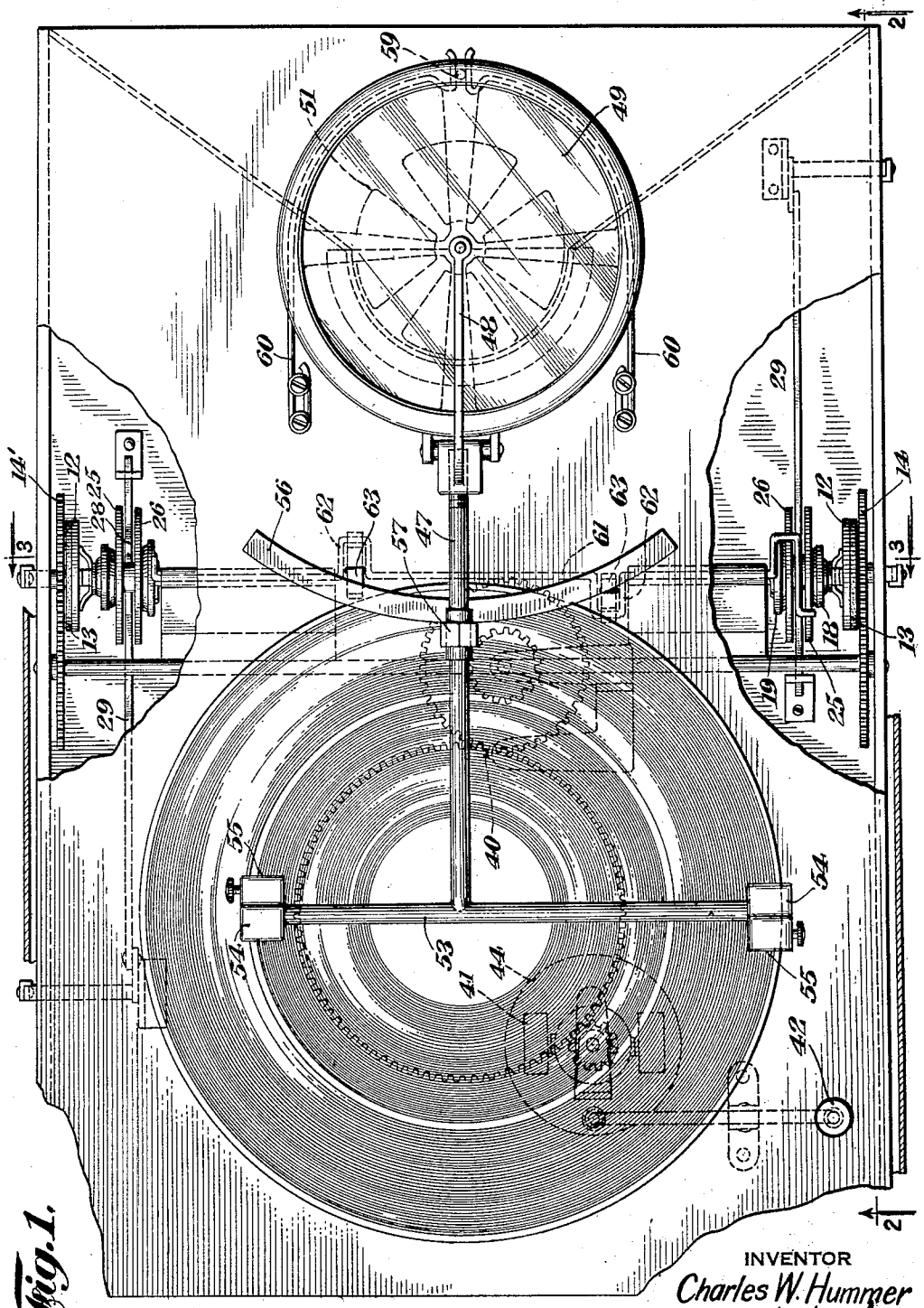


Fig. 1.

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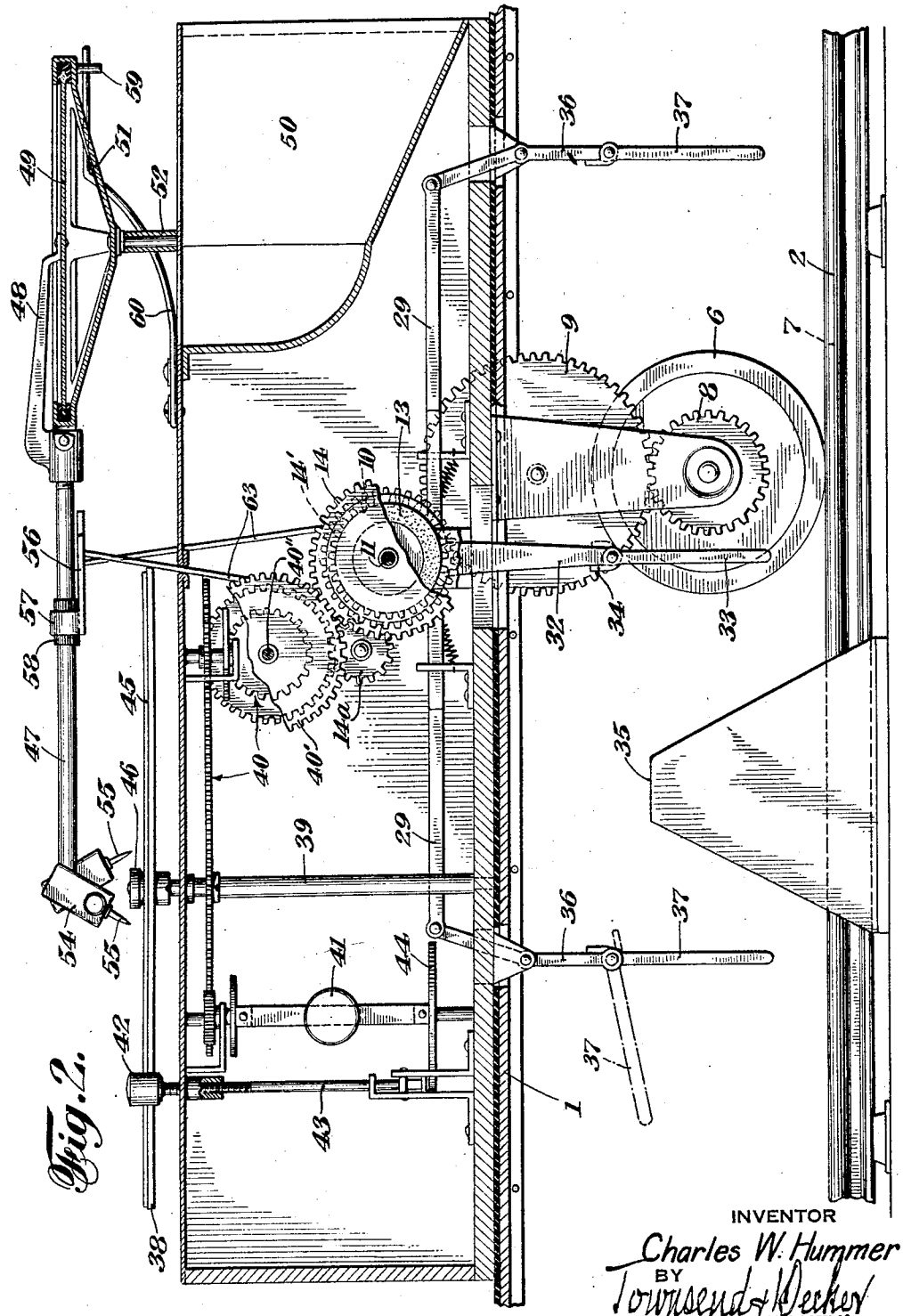


Fig. 2.

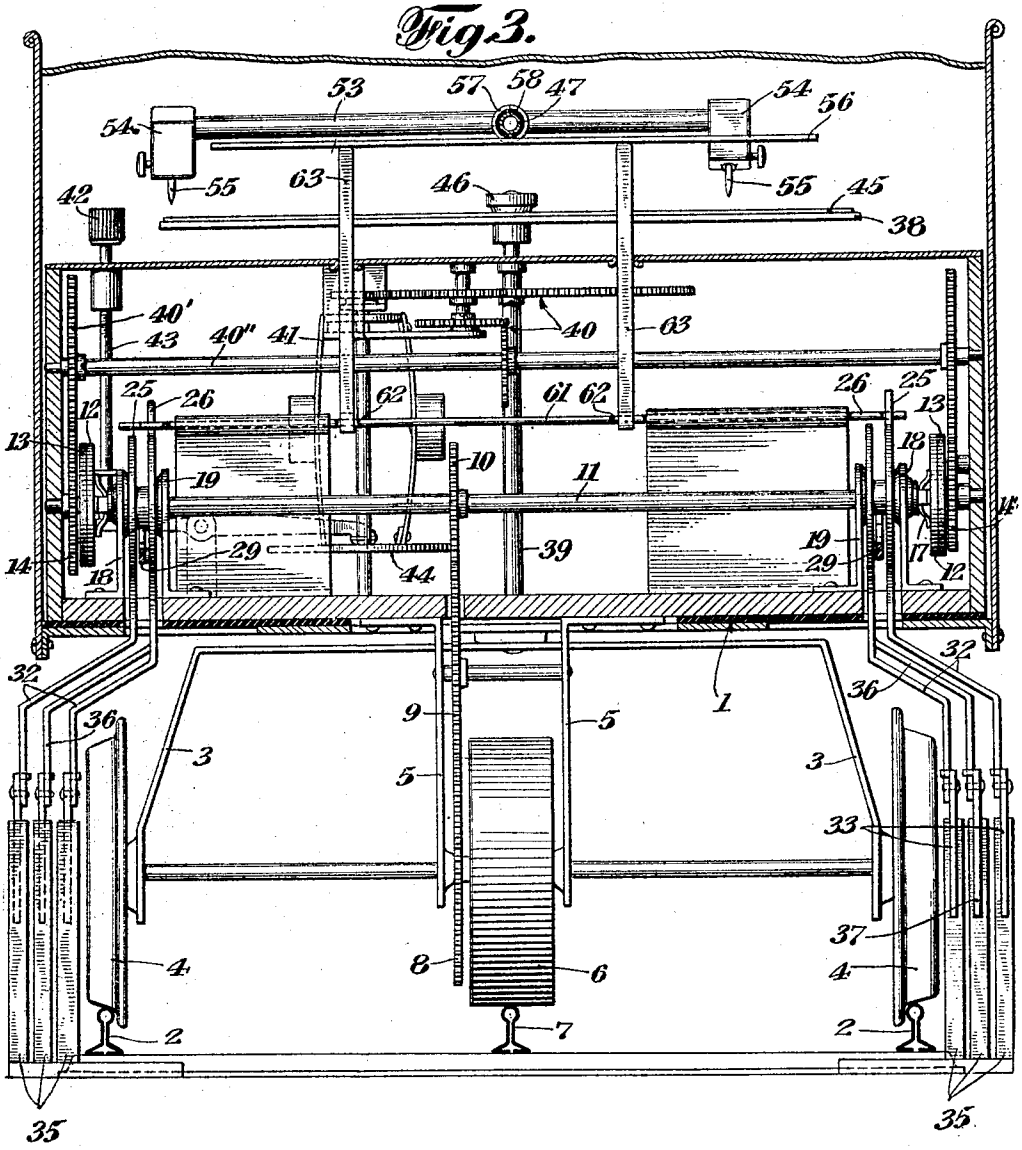
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Fig. 3.



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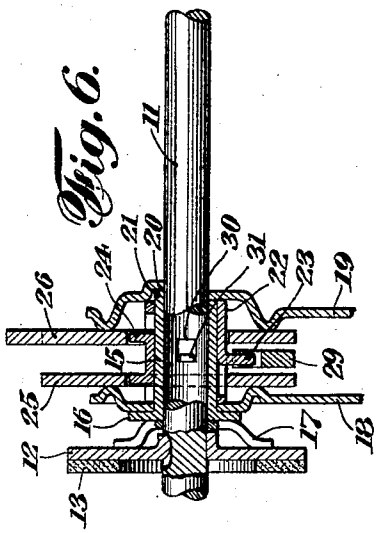


Fig. 6.

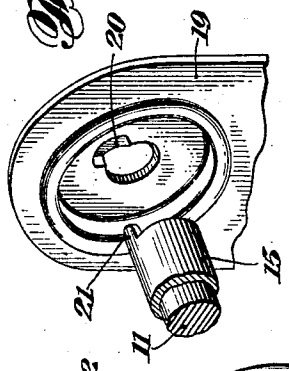


Fig. 7.

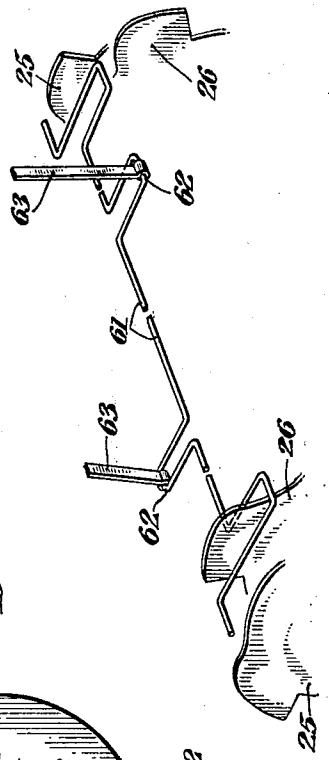


Fig. 8.

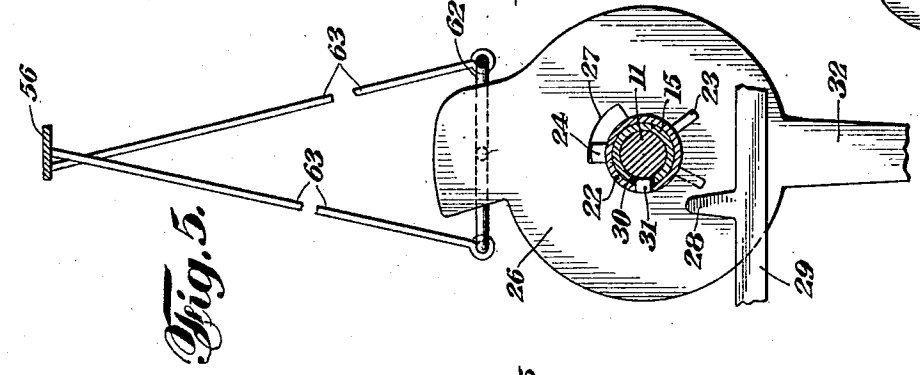


Fig. 5.

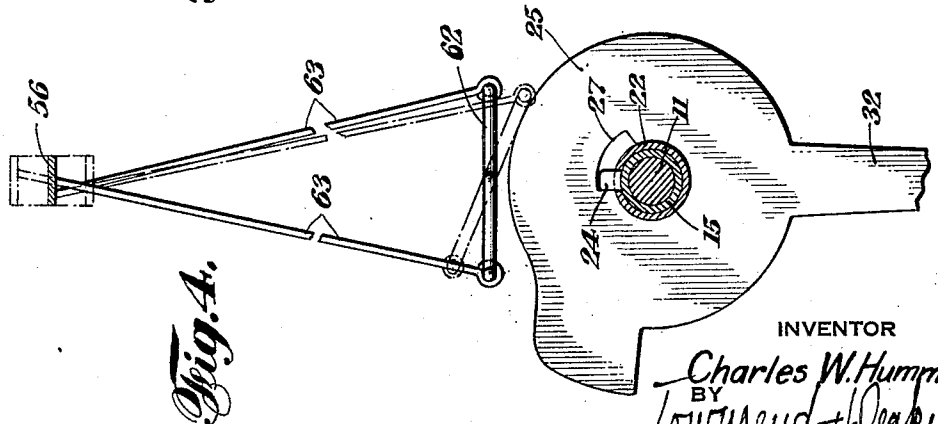


Fig. 4.

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UNITED STATES PATENT OFFICE

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TOY VEHICLE

Application filed March 2, 1932. Serial No. 596,183.

This invention relates to toys, and more particularly to acoustic toys.

The objects of the invention are to provide a toy of the character indicated which will enable the toy to function with greater similarity to the device which the toy is made to represent; to provide for selectively instituting sounds of various natures; to automatically start and stop the sound producing mechanism; to automatically start the sound producing mechanism according to the selection desired; to provide a device wherein the sound producing mechanism is actuated by the movement of the toy; to provide a device which is regular in its operation and not affected materially by increased speed of the vehicle on which it is applied; to adapt the device to utilization in toy trains; to secure simplicity of construction and operation; and to obtain other advantages and results as may be brought out in the following description.

Referring to the accompanying drawings in which like numerals of reference indicate similar parts throughout the several views;

Figure 1 is a plan of a vehicle to which my invention is applied and showing parts of the vehicle broken away to disclose mechanism thereunder;

Figure 2 is a longitudinal sectional elevation on line 2—2 of Figure 1;

Figure 3 is a cross-sectional view substantially on line 3—3 of Figure 1;

Figures 4 and 5 are sectional views showing the cams and associated parts in elevation by which the tone arm is rocked in opposite directions;

Figure 6 is a longitudinal sectional view with respect to the main operating shaft showing the clutch mechanism;

Figure 7 is a perspective view of a part of one of the brackets supporting the shaft and a portion of the shaft and a clutch sleeve thereon; and

Figure 8 is a perspective view of the crank and portions of the cams and links by which the tone arm may be rocked to its several positions.

In the specific embodiment of the invention illustrated in said drawings, reference numeral 1 indicates the body of the vehicle in general, which may be of any desired type. In the present showing I have represented the vehicle as one which travels upon tracks 2 for which purpose it is provided with a truck 3 of suitable nature and flanged wheels 4. Depending from the vehicle 1 there are shown a pair of brackets 5, 5 between which is carried a wheel 6, which functions as the driving mechanism for the acoustical portion of my invention. This wheel 6, in utilizing the invention in connection with vehicles running upon tracks, may conveniently be arranged to roll upon one of said tracks such as the central third rail 7 shown in Figures 2 and 3. When the vehicle is electrically driven, the said rail 7 is supplied with electric current and any suitable contact piece (not shown) engages said rail and connects with a suitable motor (not shown) carried by the vehicle, all as well known in the art. In this case, the wheel 6 will be supplied with an outer insulating material for obvious reasons. It is to be understood, however, that features of the invention may be utilized in a vehicle operating otherwise than upon tracks and furthermore that the driving wheel 6 may engage other surfaces than a third rail. However, in the specific disclosure, since a vehicle is illustrated running upon rails, the description will proceed as to the exact structure shown, but without confining the invention thereto. It will further be understood that the vehicle has mechanism, or may be attached to another vehicle so equipped, whereby the vehicle is actuated along the track or otherwise. The motor or other actuating mechanism is one having sufficient power so that movement of the vehicle will not be materially impaired but such movement in turn actuating wheels 6 and the acoustical mechanism. A gear 8 is secured at one side of the wheel 6 so as to rotate therewith, said gear being in mesh with another gear 9 thereabove, and which is here shown projecting through the floor of the vehicle to another gear 10, which is mounted upon the main drive shaft 11 for the acoustical mechanism. This main drive shaft 11 extends across the vehicle and at each end thereof is

associated with clutch mechanism in such manner, operation of the clutch at one end will function to actuate the acoustical mechanism when the vehicle is moving in one direction, whereas the clutch mechanism at the other end of said shaft will function to operate the acoustical mechanism when the vehicle is moving in the opposite direction. The acoustical mechanism is to be always operated in one direction regardless of which direction the vehicle is actuated. Description of the clutch mechanism, as it appears at one end of the shaft, applies substantially to the description of the clutch mechanism at the other end of the shaft.

The clutch mechanism, as shown in greater detail in Figures 6 and 7, comprises a clutch disc 12 suitably provided with a facing 13, the said disc being mounted upon shaft 11 near the end thereof and having a limited freedom of movement longitudinally of the shaft but splined thereto so as to have to rotate with the shaft. Adjacent the clutch facing 13 is a member to be rotated, such as gear 14, shown in Figure 3. When the clutch disc is actuated toward the gear, the facing 13 will frictionally engage the side face of the gear and cause the gear to rotate with shaft 11. Said gear is rotatably mounted upon said shaft but is not actuated thereby except through the contact above described by the clutch facing.

Shaft 11 passes through a clutch operating sleeve 15 in the vicinity of clutch disc 12, said sleeve having a peripheral flange 16 parallel to the clutch disc 12 and spaced a short distance therefrom. A spring 17 is interposed between the clutch disc 12 and flange 16 of sleeve 15 so as to accommodate movement of the sleeve to create a pressure upon the clutch disc and secure proper frictional contact of the clutch facing with the gear 14.

The sleeve 15 passes through a bracket 18 with the collar 16 between said bracket and the clutch disc. At the other end of the sleeve 15 is another bracket 19 which is shaped to receive shaft 11 therethrough but with the opening too small for passage of said sleeve 15 which therefore abuts at its end against the inside of the bracket, in the position of the sleeve shown in Figure 6, wherein said sleeve is slid as far away from the clutch disc as it will go. The said bracket 19 has a cam surface 20 opposite the end of the said sleeve at one part of the periphery thereof, and the sleeve has a finger 21 which will engage at its end against the said cam surface. These parts are so arranged that by rotating the sleeve a part of a revolution. the finger 21 rides upon cam surface 20 and thereupon slides the sleeve longitudinally with respect to the shaft 11 and toward the clutch disc 12, thereby causing the clutch facing to engage gear 14 and remain engaged until the sleeve is swung back again to permit finger 21 to return to the depressed end of cam surface 20.

On the outside of sleeve 15 is mounted a collar 22, said collar engaging against the brackets 18 and 19 at its opposite ends so as to be non-slidable, but arranged to have a partial rotation. A radial finger 23 projects at a central part of this collar providing a means whereby said partial rotation may be imparted thereto. Substantially diametrically opposite from this finger 23 are a pair of radially extending lugs 24 which are spaced longitudinally of the collar so as to each lie within the plane of cams 25 and 26 respectively. These cams 25 and 26 are parallel to each other and positioned between said brackets 18 and 19 in rotatable contact therewith and are journaled so as to swing upon collar 22. Each cam is provided with an arcuate slot 27 for receiving its lug 24, said slot having a length in excess of the width of the lug so as to permit relative rotation of the cam with respect to the collar. Rotation of the collar in one direction is obtained by swinging one of the cams and at that time the other cam is not swung because of the lost motion permitted by said slot 27. However, when desired to rotate the collar by the other cam from its normal position, the second cam is swung and at that time the first cam remains stationary because of the lost motion permitted by its slot 27. It may furthermore be pointed out at this time that the depending radial finger 23 is in a plane between the planes of lugs 24 and their respective cams 25 and 26, and this finger may be engaged by a dog 28 upon a bar 29 which extends longitudinally of the vehicle passing beneath the shaft 11 and between the cams 25 and 26.

The sleeve 15 and collar 22 are arranged to be rotated simultaneously one being driven by the other, but are further arranged to permit sliding of the sleeve without any longitudinal movement being imparted to the collar. As here shown, the sleeve has a longitudinal slot 30 therein which receives a tab 31 bent into the same from the collar. As a result of this construction, the clutch can be thrown into operation by swinging either one of cams 25 or 26, said cams at one end of the shaft all rotating in the same direction when being operated. In order to return the cam to its normal position, it has to be operated in the opposite direction, and this is obtained through a rotation of the collar 22 by its finger 23, dog 28 and bar 29.

Cams 25 and 26 are provided, one to obtain a desired operation of an acoustical mechanism and the other one to obtain another desired operation of the acoustical mechanism, and it is to be understood that by having shown two structures of this nature, I have illustrated my invention as enabling me to obtain a plurality of acoustical reproductions which may be selectively operated, and

I do not confine myself to only two such mechanisms as it is within the scope of the invention to utilize as many as desired. As here shown, each cam has an arm 32 depending therefrom acting in the nature of a lever and enabling the cam to be operated from a position outside of the vehicle. In the specific disclosure, the lower end of arm 32 has a pawl 33 pivotally carried thereby, and which has a shoulder 34 adapted to limit the swing of the pawl in one direction with respect to the arm. Consequently, as the vehicle moves forwardly, the pawl may be caused to engage a protuberance or trip 35 and thereby swing the lever 32. However, if the vehicle is moving in the opposite direction, the pawl merely rides over the trip, swinging as indicated in dotted lines at the left hand end of Figure 2, thereby passing over the trip so as not to be operated. When the vehicle is going in that direction, the corresponding mechanism at the other side of the vehicle is then functioning to operate the clutch. The bar 29 is likewise adapted to be operated by exterior mechanism, the bar having its forward end pivoted to the upper end of a lever 36 similarly constructed with a pawl 37 pivoted to its lower end. In Figure 2, the lever and pawl at the right hand end are for operating bar 29 at the side of the vehicle next to the observer, whereas the lever and pawl at the left hand end are at the further side of the vehicle, making it clear that the pawls function in opposite directions, thus enabling the vehicle to be operated in either direction.

The acoustical mechanism provides a record table 38 mounted upon a vertical and rotatable shaft 39. This shaft 39 has a suitable train of gearing indicated generally by the numeral 40 for actuating the same, said train of gearing deriving its power from gear 14 when driven by clutch disc 12. Said gear 14 meshing with gear 40′ carried by a shaft 40″ which shaft carries one of the gears of said train. A governor 41 is likewise preferably connected in this train of gearing so as to maintain the record table 38 at a constant speed regardless of the increase of speed of the vehicle. Adjustment of the speed of the governor may be regulated by any suitable adjusting device such as screw 42, as will be understood by persons skilled in the art, the screw raising or lowering a rod 43 with respect to a disc 44 carried at the reciprocating end of the governor.

The mechanism heretofore described has been described generally as that at one side of the vehicle and as applicable to the vehicle when it is moving in one direction. When moving in the other direction, however, in order that the record table will always rotate in the same direction it will be necessary to interpose an additional gear 14*a* between the train of gearing and the gear 14′ which corresponds to and functions in the same manner as the gear 14.

The record table 38 is adapted to receive a record 45 thereon, the same being held in place by a nut 46 on the upper end of shaft 39. The record preferably has a plurality of series of grooved convolutions, each series having sound records of different kinds of sounds. For instance, one series of grooved convolutions may be such as to produce the sounds of a bell ringing, while the other series of grooved convolutions may be such as to produce sounds of a whistle blowing. However, more than two series of grooved convolutions may be provided to permit the production of other sounds, or the grooved convolutions indicated may have means for producing other sounds than the specific ones mentioned. The character of the vehicle in which the device is employed will determine to some extent the particular sounds to be reproduced, and I do not confine myself to the production of any particular sound.

I provide a tone arm 47 which extends radially from substantially the middle of the record to a distance therebeyond, and is there connected to a vibrating arm 48, the other end of which is secured to a diaphragm 49. The vibrations created in the tone arm 47 from the record are transmitted through the vibrating arm 48 to the diaphragm 49 which thereupon sets up sound waves that may be heard. The diaphragm 49 is arranged in a position over an amplifying horn 50 so the sounds will have a desired intensity. As here shown, the diaphragm is carried by a dished frame 51, the lower part of which is provided with openings directed toward the horn, said frame being supported at its middle part by a bracket 52.

As here shown, the end of the tone arm 47, overlying the record, is provided with a cross arm 53, one end of which is longer than the other, and the outer ends of both of which have needle supporting heads 54 thereon. The needle, 55, in one of these heads is adapted to engage in the outer series of convolutions in the disc, whereas the other needle 55 of the head 54 on the shorter end of the cross arm 53 will engage in the inner series of convolutions of the disc. However, preferably one needle, only, at a time, can engage the record. In order to engage the needle with the record, tone arm 47 is twisted. This twisting is permitted by a sufficient length of threads and ease of operation between the attachment of tone arm 47 with the vibrating arm 48. Between said point of attachment and the cross arm 53 is provided a bracket 56 clamped as at 57 upon the said tone arm, preferably with an intervening sleeve of rubber or the like, 58, to take up undesired vibration. The said bracket 56 is shown extending beneath the tone arm 47, and laterally therefrom in both directions,

and is further shown as arcuate in construction with the center of curvature the center of support for the diaphragm frame 51. The said frame is pivotally mounted on its bracket 52 enabling the tone arm to swing under influence of the convolutions of the record, and to be returned to initial position when released therefrom. As here shown, the diaphragm frame 51 has a depending pin 59 adapted to be engaged by springs 60, the other ends of which are secured to the vehicle. Rotating the diaphragm frame in one direction will deflect one of the springs, whereas rotating the frame in the other direction will deflect the other spring. As soon as the tone arm is raised to disengage the needle, whichever spring has been deflecting will thereupon act to return the tone arm to its normal position.

The tone arm is arranged to be automatically tilted by one or the other of cams 25 and 26 heretofore described in connection with the clutch mechanism. One of the cams, as 25, is arranged to tilt the long end of the cross arm 53 upwardly and the short end downwardly, whereas the other cam, 26, performs a reverse operation tilting the short end upwardly and the long end downwardly. It will therefore be seen that the cams 25 and 26 may operate independently to obtain the desired tilting of the tone arm. The particular connection here shown from the cam to the tone arm is somewhat diagrammatic, and constitutes a crank 61, shown in detail in Figure 8, with off-set portions in the path of movement of the several cams and having other off-set portions 62 connected to links 63 which extend upwardly into engagement with the underside of the arcuate tilting bracket 56. Rotation of crank 61 through a partial revolution under the influence of one of the cams will result in an upward movement of one of the links 63 and a downward movement of the other link, thereby imparting a correspondingly tilting displacement of the cross bracket 56. The relative positions of these links may be arranged to obtain the proper degree of tilting and proper balancing of the moving parts.

In operation, it will be clear that as the vehicle moves along in one direction, one of the arms 32 will be swung, thereby performing two functions, the first of which is to throw clutch facing 13 into engagement with its adjacent gear and start the record table rotating. The other function will be to swing crank 61, because of engagement of one of the cams therewith, and thereupon swing the cross arm 53 of the tone arm to engage the desired needle with the record. The record continues to play until it comes to the end of the convolutions or until the releasing arm 32 is swung. Swinging of that arm rotates both the sleeve 15 and collar 22, thereby retracting the clutch facing 13 and stopping rotation of the record, and also returns the cam which had been previously rotated back to its normal position, and thereby returning the crank 61 to its normal position. Such a return of the crank to its normal position causes links 63 to level the cross bracket 56, which in turn raises the needle from the record. As soon as the needle is released from the record, the returning spring 60 on the diaphragm frame 51 rotates the frame back to its normal or initial position, the cross bracket 56 at such time sliding upon the upper ends of links 63.

Obviously detail changes and modifications may be made in the construction and use of my improved toy without departing from the spirit or scope of the invention, and I do not wish to be understood as limiting myself to the exact structure shown or described, except as set forth in the following claims when construed in the light of the prior art.

What I claim is:

1. A toy of the character described, comprising a record table and a tone arm, said tone arm having a cross arm, a needle mounting device at each end thereof; and means for rocking the tone arm for tilting one end or the other of the cross arm toward the table and for returning the tone arm to normal position with both ends equi-distant from said table.

2. A toy of the character described, comprising in combination with a vehicle, a record table and a tone arm, said tone arm having a cross arm, a plurality of needle mounting devices on said cross arm, and means for automatically starting the record table to rotate and lowering one of the needle mounting devices to engage the needle thereof with a record.

3. A toy of the character described, comprising in combination with a vehicle, a record table and a tone arm, said tone arm having a cross arm, a plurality of needle mounting devices on said cross arm, means for automatically starting the record table to rotate and lowering one of the needle mounting devices to engage the needle thereof with a record, said automatic means comprising a pair of cams, one of which will swing the tone arm in one direction, and the other of which will swing the tone arm in the other direction.

4. A toy of the character described, comprising in combination with a vehicle, a record table and a tone arm, said tone arm having a cross arm, a plurality of needle mounting devices on said cross arm, means for automatically starting the record table to rotate and lowering one of the needle mounting devices to engage the needle thereof with a record, said automatic means comprising a pair of cams, one of which will swing the

tone arm in one direction from its normal position, and the other of which will swing the tone arm in the other direction from normal position, and means for returning both cams and the tone arm to normal position.

5. A toy of the character described, comprising in combination with a track having a trip adjacent thereto, a vehicle having an acoustic device thereon driven by movement of the vehicle, a clutch for throwing the acoustic device into operation, and means on the vehicle to engage the trip and having a connection with the said clutch for starting operation of the acoustic device by engagement of said means with the trip.

6. A toy of the character described, comprising in combination with a track having a trip adjacent thereto, a vehicle having an acoustic device thereon driven by movement of the vehicle, a clutch for throwing the acoustic device into operation, a slidable means for operating said clutch and means on the vehicle to engage the trip and having a connection for sliding said slidable means and thereby operate the clutch.

7. A toy of the character described, comprising in combination with a track having trips adjacent thereto, a vehicle having an acoustic device thereon driven by movement of the vehicle, a clutch movable in one direction to actuate the acoustic device and movable in reverse direction to stop said device, means on the vehicle adapted to engage one of the trips having a connection with the clutch for the acoustic device for starting operation thereof by engagement of said means with the trip, and another means for engaging another trip for throwing out the clutch for stopping operation of said acoustic device.

8. A toy of the character described comprising a record table and a tone arm, a roller adapted to rotate when the toy is in motion, interconnecting means between said roller and record table whereby said record table will be rotated when said roller rotates, a cross arm on said tone arm, a plurality of needle mounting devices on said cross arm, a tilting device for said cross arm and cam means connected with said tilting device for lowering one of said needle mounting devices to engage the needle thereof with a record.

9. A toy of the character described comprising a record table and a tone arm, a trip, a roller adapted to rotate when the toy is in motion, interconnecting means between said roller and record table whereby said record table will be rotated when said roller rotates, a cross arm on said tone arm, a plurality of needle mounting devices on said cross arm, a tilting device for said cross arm, cam means connected with said tilting device for lowering one of said needle mounting devices to engage the needle thereof with a record and a link engaging said cam means for actuating the same upon engagement of said link with said trip.

10. A toy of the character described comprising a record table and a tone arm, a member adapted to rotate when the toy is in motion, interconnecting means between said member and record table whereby said record table will be rotated by rotation of said member, a needle holder on said tone arm, an actuating device for said needle holder and means connected with said device for lowering said needle holder adjacent a record and for raising it therefrom.

Signed at New York, in the county of New York, and State of New York, this 29th day of February, A. D. 1932.

CHARLES W. HUMMER.